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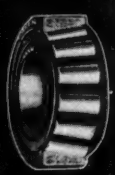

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R. H. STINCHFIELD, *Managing Editor* SID NOBLE, *Editor*

Editorial Offices: 19 West 44th Street New York

VOLUME XII NUMBER FIVE

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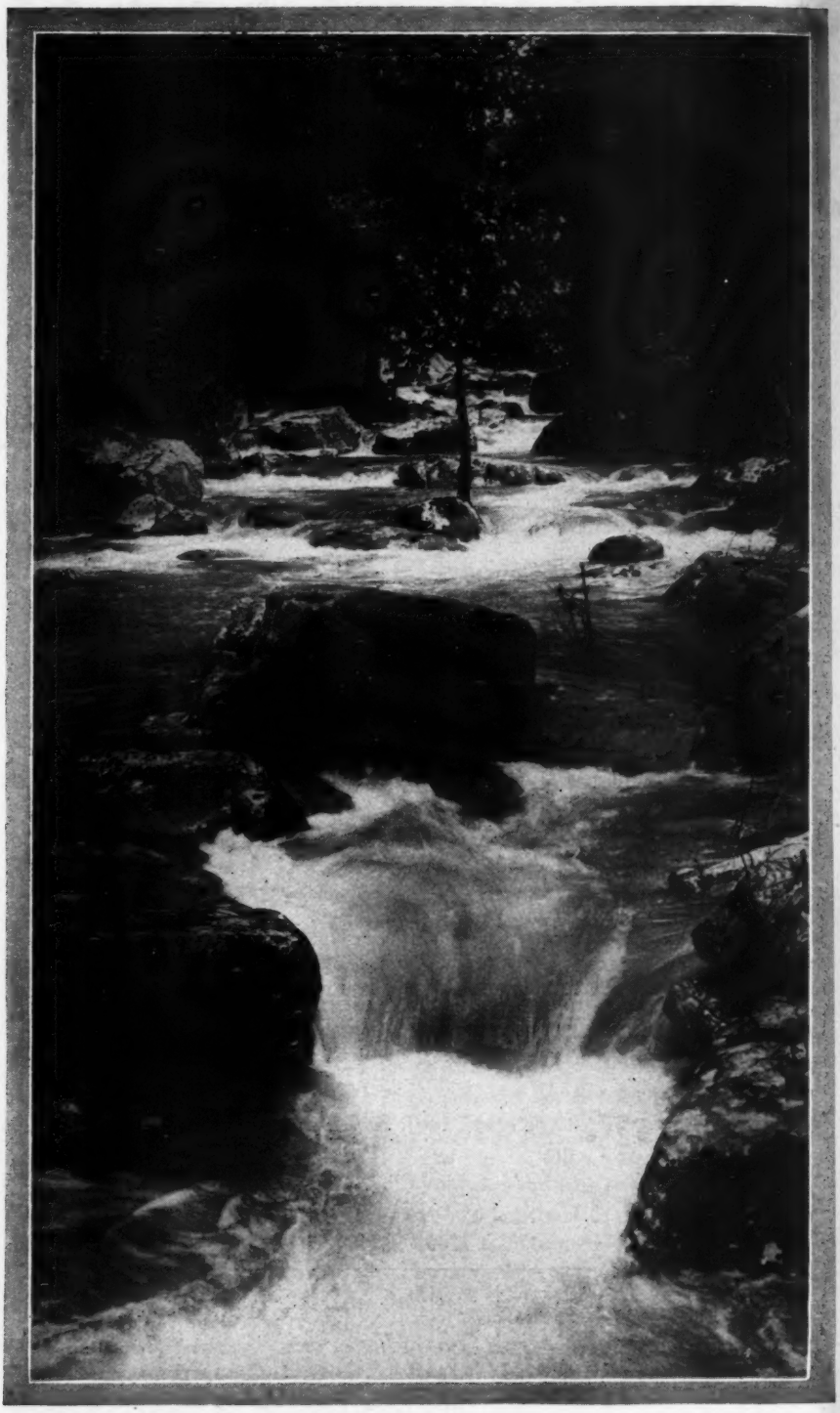

Better Crops with PLANT FOOD

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VOL. XII NEW YORK, MAY, 1929 No. 5

Jeff pays a timely tribute to—

Mothers

By Jeff McDermid

MOST mothers would forego floral offerings and mushy tributes and take their reward in raising a family not too full of original sin and Dad's peculiarities. After exterminating the former and enduring the latter for half a century, the average mother prefers peace and quiet to a place in the spotlight. She knows she is a heroine, but she prefers to be somebody's model than to wear a medal.

If there were published a Who's Who for Mothers the Congressional Library could hold only the index!

When I wear my white carnation to commemorate Maternity Day, I think of a patient little woman who saw few carnations. Her garden or what was left of it after the small boys and their dogs passed the first ecstasy of summer madness—was the haven of marigolds, verbenas, and hollyhocks.

Sometimes I get absorbed in the grind of routine and forget to buy the emblematic boutonniere on that significant morning. Yet when I discover this shortcoming, it does not upset me or spoil my day, for have I not been stumbling along immersed in those self-same homely tasks that caused Mother to be sometimes inconsiderate of her personal adornment? Perhaps it's better to forget the florist and make every day a silent, though perhaps unconscious, tribute to the one who "fetched you up by hand."

Wreaths and encomiums, paeans and memorials, glory and ritual—what part have these in making any honest heart beat more truly toward an object of natural veneration? The need of cleansing visions and death-bed repentances are not to be included in the present discussion. I address myself, as always, to normal humanity, who are neither carrying lilies nor sawed-off shotguns, and whose business is to provide a square meal rather than a round of drinks. The Mothers of Main Street, as I know them, enjoy *being* poems rather than reading them.

MOTHERS have been treated like farmers. By this I mean that mothers have been both praised and pitied, designated as indispensable and inefficient and made the subject of complete college courses written around their age-old vocations.

The bibliography of agriculture is only equalled by the bibliography of motherhood. Each has its journalists, its lecturers, its demonstrators, and its saviors. Laboratories have come to the aid of babies and barley, science has found remedies for child colic and calf scours, and savants have done almost as much for cross-eyed infants as they have for cross-bred chickens.

What makes bookish theory and actual practice so divergent and irritating on both of these subjects is that teachers do not have to live with the children and the crops. They are not obliged to castigate the one and cultivate the other. By the time a mother has finished her task and is capable of posing as an authority, she wears specs and false teeth and is anxious to change the subject.

Hence I am not looking for help from the city library or correspondence school to get posted on motherhood. Most of the best-looking books are written by maiden aunts or devoted professors who scribble feverishly for an excuse to stay away from home until the kids are asleep. The books are indeed very well bound, thank you, but as someone has said, "You can't always tell by *de luxe*."

From a plain, practical standpoint these tomes are too abstruse for the flickering powers of concentration of a dame who has been slightly perturbed by what Thomas Hardy calls "the muck and muddle of rearing a family."

Yet to be absolutely fair, I have observed that many fine young mothers get along very nicely with Holt in one hand and Hoyle in the other, and they know when *clubs* are trumps with either! And after all, both authors deal in hearts and a reader may *say* "whist" and *play* it, too!

Relations between parents and their offspring have undergone a change even in my generation. Modern movements in child study, applied psychology, and child conservation, together with the disquieting complexities of latter day society, are obvious reasons for the transformation.

Soothing syrups, sugar teats, and red flannels; ear-muffs, wristlets, and nailed-down casements; copy-books, family prayers, and a slap with the slipper—these have vanished with the saints of yesteryear. The sinners of the present age require more synthetic discipline and diversion.

"AS the twig is bent" has changed until the parent is broke. Yet without some care, the little saplings may grow into old saps. Personally, I have little faith in the liberalist vogue of child rearing which makes the parent only a provider but seldom a persuader. Our mothers did not know much about the word "ego," but they knew a lie when they heard it and they halted a lot of cussedness by a trip to the woodshed.

Old-fashioned mothers made the error of putting too much trimming on infant bonnets and petticoats, while the modern ones are apt to insist

(*Turn to page* 60)

Potash Turns *the* Trick

By James J. Lacey

Former County Agent, Green Lake County, Wisconsin

WHEN Henry Traugott of Berlin township in the northern part of Green Lake county, Wisconsin, grows potatoes, he has a definite market in view. This market is the nearby cities of Oshkosh and Fond du Lac. Furthermore, when Henry Traugott grows potatoes, in planning his crop he keeps definitely in mind the demands of his market with respect to quality and number of bushels, and the soil fertility necessary to profitably meet those demands.

Normally, this progressive farmer plants about 10 acres of potatoes, an amount considered as a mere sideline to the other activities on the farm, but an acreage that in a good season nets a handy cash income. Mr. Traugott finds the lowly spud a crop that fits nicely into his other general farm practices. He is a firm believer in soil fertility maintenance, and he finds the potato a crop that responds readily to the fertility supply in his well-kept Miami fine sandy loam.

His regular farm crop rotation is built around legumes, and "A Legume on Every Acre Every Year," has become a slogan and an established practice with him. He uses alfalfa and medium red clover as his hay crops. His pasture acres are growing sweet clover. His fields of corn for ensilage purposes carry an abundance of Manchu soybeans. Even the portion of his cornfield that is "hogged down" is sown to sweet clover at the time of the last cultivation. Every acre of his small grain is seeded to alfalfa, medium red, or sweet clover. In other words, he works the legumes for all they're worth.

The Traugott herd of 15 dairy cows return a goodly amount of barnyard manure to the cropped fields. But in spite of this general good care in the up-keep of the soil fertility, last year Mr. Traugott began to wonder if after all he was not dissipating his supply of fertility. He had read and heard much about commercial plant food and about its results even on well-kept farms. He wondered whether the time had come when he, too, should be us-

Left: Mr. Traugott and two rows fertilized with 3-8-16. Right: Mr. Lacey and two unfertilized rows.

ing the commercial supplement to his barnyard manure. He felt that perhaps in spite of his vigilance he was removing plant food from his soil to an extent that was not compensated for in the returns from his legumes and his barnyard supply.

Therefore, last spring he was very willing to cooperate when approached on putting on a fertilizer demonstration on his potato crop. He was not at all certain that fertilizers would make any wonderful showing, but he wanted to know, and the desire for knowledge is the cornerstone of unreserved cooperation.

The field selected for the demonstration had been growing a mixture of timothy, medium red, and sweet clover in 1927. This had been turned under in the fall, and since the field was more than a mile away from the farm buildings, no manure was applied for the 1928 potato crop.

Details were discussed and readily settled. The fertilizer was to be applied, drilled in the row, at or below seed level, and at the rate of 600 lbs. per acre. Four different analyses would be used, 3-8-0, 3-8-6, 3-8-12, and 3-8-16.

The potatoes would be planted checked both ways, at three-foot intervals, to allow cross cultivation because of the presence of some quack-grass. Four areas of one-third acre each would be fertilized on a uniform strip of soil, with one-third acre through the center left as a control or check plot.

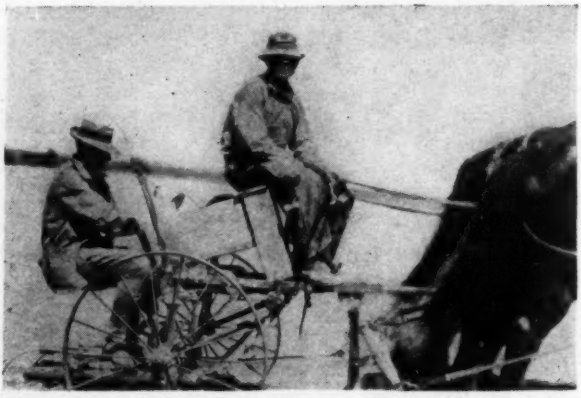
A very efficient fertilizer sower was made from an old discarded corn sulky cultivator. The shovels were all removed, and one large shovel from an old-style shovel plow was fastened rigidly between the shovel beams. A fertilizer supply box was mounted on the frame of the sulky cultivator, and a rubber hose led from a hole in the bottom of the box to a point directly back of the large shovel. Then three spring teeth of an old spring-tooth harrow were secured between the two shovel beams, behind the large shovel.

In brief, this was the plan: The large shovel, when lowered, would dig a trench about seven or eight inches deep and of about the same width. The fertilizer would be fed down into this trench through the rubber hose that led from the supply box. The spring teeth, lowered, would follow behind the fertilizer stream and mix thoroughly the fertilizer with the soil in the bottom of the trench. The potatoes would be planted at three-foot intervals in the trenches or rows that would still be visible where the fertilizer had been applied. Selected Rural New Yorker seed that had been treated with hot formaldehyde for scab and scurf control were to be used in the demonstration.

When planting time arrived, the plans worked out perfectly. Twelve rows across the field, each about 25 rods long, made each one-third acre. The fertilizer sower worked true to form. The fertilizer was applied on May 30, and the planting was done one day later.

Forty-two unfertilized rows were left on the south side of the field to avoid any possibility of having the

(*Turn to page* 49)



Mr. Traugott made this fertilizer sower from an old discarded sulky cultivator.

Gassing Groundhogs

¶ War on these pests has been declared.

By James Silver

United States Biological Survey

DURING April and May is the open season for gassing groundhogs, and there are three good reasons for confining gassing activities to this time of year.

First, groundhogs should be destroyed early before they get a chance to damage the year's crops and before the season's young can grow up and make double the amount of gassing necessary. Second, the groundhog burrows should be fumigated while the vegetation is short so that they can be found more readily and fewer of them missed. Third, in order to avoid destroying valuable wild life, groundhog burrows should be gassed at a season when they are most easily identified and when they harbor no other animal.

April and May are the only months that will fulfil these three conditions. Much has been said and written in opposition to the gassing of groundhogs at any season, because of the contention that other burrow - inhabiting and valuable wild life —including foxes, skunks, and rabbits— are destroyed in large numbers. Federal specialists have shown this contention to be false, however, by fumigating a large number of groundhog burrows and then excavating them to note results. In no case was any dead animal found other than the groundhog—where gassing was done during April and May.

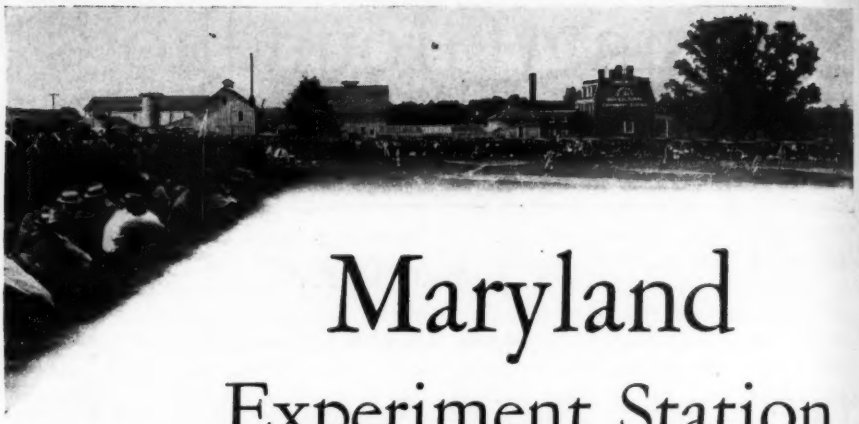
The groundhog is also called a woodchuck.

Most farmers are well acquainted with the location of all the active burrows on their lands, and because they see them almost every day they know which are being used by the groundhogs.

The Method

Farmers may occasionally have to destroy a fox or a skunk to protect their poultry, or to war on rabbits to save their crops, but on the whole farmers are as ardent conservationists as other folks. In addition to recognizing the importance of these animals for their fur or food, farmers know that most of them are inveterate foes of the small rodents that prey incessantly on their crops.

About two ounces of carbon disulphide or one ounce of calcium cyanide placed well down into the groundhog burrow, and the burrow tightly closed with an inverted sod, will do the trick. Arrange to do a thorough job on the area to be protected, and start early enough in the season to allow time before the last of May to go over the ground a second time, if necessary.



Maryland Experiment Station

By Melville D. Bowers

Editor, University of Maryland Extension Service

BETWEEN the year 1847, when the Maryland Agricultural Experiment Station may be said to have had its origin, and the present year of 1929, there is a span of no more than 82 years. Yet in that interval of time the world has moved fast and far. So fast and so far, indeed, that it is likely to forget that American agriculture in 1847 was like an ungainly stripling, racing through its adolescence to the mature and seasoned growth it so speedily attained.

Today, in the minds of most people, American agriculture resides west of the Mississippi river. How strange it seems that this selfsame agriculture was once cradled in what is now regarded as the effete and highly conservative East. And yet it must be true, for in 1847 Conestoga wagons were still toiling along rude trails into the Northwest. The gold rush to California was history still one year away from the making. New York was giving promise of becoming a great metropolis, but if it had stopped to number its population it likely would not have discovered more than half a million souls. There were probably not 50 towns in the entire United States that could muster in excess of 8,000 inhabitants. Railroads were building, and the first telegraph lines were being constructed. Industry was expanding, but was playing a minor role to agriculture as a source of wealth and occupation. New varieties of seeds and plants were being distributed from the Patent Office, but there was no United States Department of Agriculture.

During this period, Maryland, like many other eastern states, was contributing largely to the agricultural development of the nation. A few years earlier, a Maryland man had secured the first patent on a reaper and had demonstrated it successfully on the farm of General Tench Tilghman in Talbot county. An established agricultural paper had been spreading its influence over Maryland and adjoining states for years. The State had adopted the infant canning industry and was struggling with the intricate problems of its growth. Commercial fertilizers were just coming into use, and Maryland was laying the foundation for its subsequent place of leadership in this particular industry.

Out of this pioneering period in Maryland agriculture, grew the State Agricultural Experiment Station. In

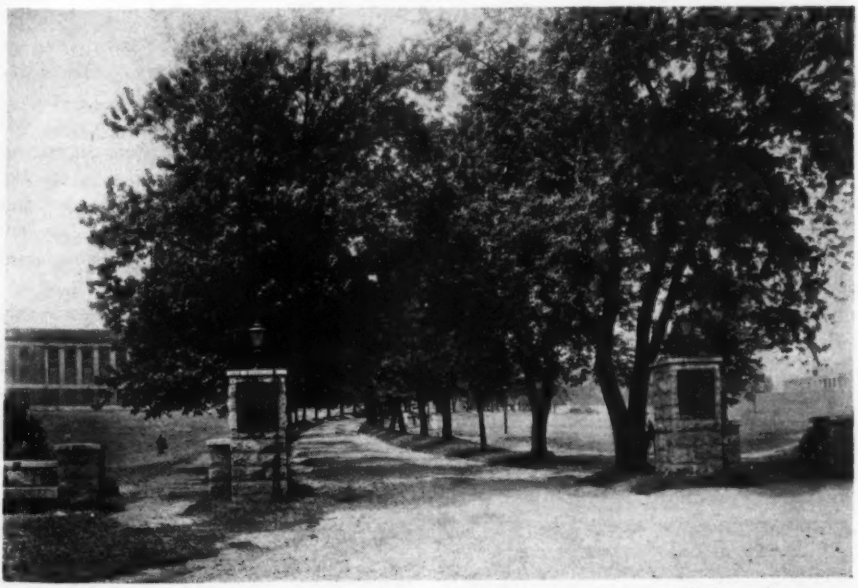
1847, to be exact, the legislature passed an act providing for the establishment of an agricultural laboratory for the study of soils and fertilizers. It was the first thing of its kind in America, and from this source possibly might be traced the later preeminence of the state in its efforts to study and classify the various types of agricultural soils.

This early law provided for a chemist who was required to visit each county annually and give a course of lectures on the results of his investigations. The county commissioners, moreover, were authorized to publish these lectures and to distribute them to the farmers of their counties. Thus, in 1847 did Maryland have in effect both an experiment station and an extension service.

In 1856, or nine years later, the Maryland Agricultural College was chartered. It was the second agricultural college in the western hemisphere. It was entirely under private ownership and management, but the charter not only empowered the trustees to do educational work but set forth a requirement that agricultural investigations be undertaken. In 1859, accordingly, the first year of the college's operation, tests were inaugurated on fertilizers then on sale in Maryland. These tests were conducted with hay, grain crops, and potatoes and were continued until interrupted by the Civil War.

The First Director

Apparently little systematic experimental work was done in Maryland following the Civil War until the enactment of the Hatch Act in 1888. The passage of this bill seemed to inject new life into the trustees of the Maryland Agricultural College, and they immediately set out to find a man suited to the task of directing the investigational work and serving as president of the college. Their choice was a credit to their serious purpose and to the high aims which they had for the school. They undertook to secure and did secure Major Henry E. Alvord, professor of agriculture at the Massachusetts Agricultural College and previously director of the Hough-



Founders' Gateway at the University of Maryland bears tablets with the names of the early patrons of the Maryland Agricultural College.

Dr. Raymond A. Pearson, President of the University of Maryland.

ton Experiment Farm in New York. Speaking of the probable appointment of Major Alvord, the Maryland *Farmer* of April, 1888, said:

"In case of Major Alvord's acceptance, his term of office will begin March 20 of this year. He is about 55 years of age and is now in charge of the Massachusetts Agricultural College at Amherst, to which position he was called after three years' management of the Houghton Experimental Farm in New York State and where he was very successful. He has been recommended as a man of great executive ability and in every way eminently fitted for such a position. He is a member of the executive committee of the Jersey Cattle Club and has a national reputation. He was chairman of the Association of American Agricultural Colleges and Experimental Stations to secure the appropriations of the Hatch bill and in this committee was associated with the presidents of the Pennsylvania State College, Michigan Agricultural College, the Kentucky Agricultural and Mechanical College, the University of Tennessee, and the Cornell University."

One of Major Alvord's first acts on assuming his new duties was to draw a warrant on the State treasury for $30. This sum constituted a six-years' appropriation from the State for the Maryland Agricultural College. It had not been collected. The bill authorizing the appropriation, it seems, was originally drawn to provide for $5,000 annually. But legislatures then as now had the trick of attaching surprising amendments, and this particular bill was enacted with an amendment to strike out the three naughts after the figure five and insert the words "and no more."

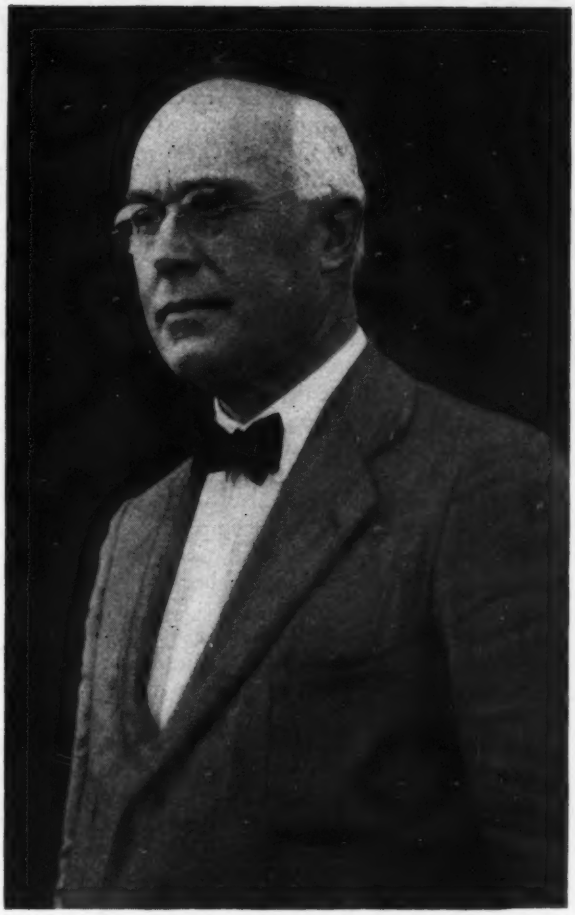
The finances of the institution were at a low ebb. There was a debt of approximately $20,000 and the only income came from the interest on the land fund which was below what it should have been. Major Alvord received his salary from the Experiment Station and contributed his services as president of the College.

To make matters more difficult, there was apparently a strong feeling in the State that the prime purpose of the college farm was to demonstrate that farming was a profitable occupation. In the Maryland *Farmer* of

March, 1892, there is a statement showing that the expenses of the college farm the previous year were $1,450.87. Receipts from products of the farm were but $1,126.73, an apparent loss for the year of $324.14. Editorial comment on this condition was long and acid, concluding with these words: "We know that farming in Maryland can be made as grand a success as anywhere in the world, and no better home for enterprising farmers and their growing families can be found in our country. It should be —it must be demonstrated in a model farm at our Agricultural College."

It can well be understood that Major Alvord's four-year tenure of office as director of the Experiment Station and president of the Agricultural College was not all clear sailing. Under the regime then in vogue, the position of each and every member of the faculty and staff was automatically vacated each year. If the incumbent was not fortunate enough to be re-elected, he instituted search for a position elsewhere. Major Alvord was not excepted from this rule.

Major Alvord remained, however, until 1892. He left behind him a very substantial record of achievement. He had reduced the college debt to approximately $3,000, had rallied to the service of the institution some most capable men, and had brought about many other noteworthy improvements.



Dr. Harry J. Patterson, Dean of the College of Agriculture and Director of the Maryland Experiment Station.

Dr. H. J. Patterson, now director of the Maryland Experiment Station and dean of the College of Agriculture, was among those whom Major Alvord brought to the Maryland Agricultural College during his term of office. Dr. Patterson had been assistant chemist at the Pennsylvania Experiment Station. His father was superintendent of the farm there.

On one of Major Alvord's visits to the Pennsylvania station, he had encountered young Patterson carrying in from the fields a half bushel of weeds. His father asked him in the presence of Major Alvord if those

were all the weeds he had been able to find. His reply was in the affirmative. Major Alvord was so impressed by this careful farming of a 400-acre tract, that in his first year of office he offered young Patterson the position of chemist at the Maryland institution.

It was during Major Alvord's incumbency, too, that Milton Whitney came to Maryland as soils physicist. He was a graduate of Johns Hopkins University, and his Alma Mater provided him with a laboratory and instruments at Clifton, the old Johns Hopkins manor, in Baltimore. His expenses and salary were paid jointly by the trustees of the Maryland Agricultural College and the United States Department of Agriculture.

Dr. Whitney's work, of course, is widely known. The first soil survey work in the United States was begun in Maryland under his direction. The Division of Soils which finally became the Bureau of Soils in the United States Department of Agriculture was inaugurated as a result of his outstanding achievements in Maryland, and he was the man who organized it and headed it until just a few months prior to his death last November.

It is rather interesting to note in this connection that there have been but two men at the head of the soils work in the United States Department of Agriculture and both of them came from the Maryland Experiment Station. The one was Dr. Whitney and the other is Dr. A. G. McCall, who gave up his position at the Maryland Station last summer to become chief of the Division of Soils in the newly created Bureau of Chemistry and Soils.

In 1892, Robert H. Miller, of Spencerville, Montgomery county, was chosen to succeed Major Alvord as Director of the Maryland Experiment Station, although there was a gap of three months before his appointment during which Dr. Patterson served as acting director.

There was considerable progress of a constructive character during the six years that Mr. Miller directed the activities of the Maryland station. The San Jose scale came into prominence during this period and resulted in the inauguration of research in entomology and plant pathology. A serious outbreak of spinal meningitis in horses also occurred in the State about this time and opened up the way for investigational work in livestock diseases.

Progress Was Steady

From this point on, the work of the Maryland Agricultural Experiment Station progressed steadily under the wise and able direction of Dr. Patterson, who this year rounds out 40 years of service with the college, part of the time as its president, and 30 years as director of the Maryland Experiment Station.

The various lines of experimental work, necessarily elementary in the early stages of the Station's history, have been broadened notably. Reference has already been made to some of these, which in the main consisted of

(*Turn to page* 58)

The short course for rural women is an annual feature at the University of Maryland.

Industry Presses Onward

¶ Bringing to colleges of agriculture and to industries that serve agriculture special problems and opportunities.

By G. J. Callister

THE march of industry is compelling individual and group adjustments in thinking and in doing the day's work, which few of us can escape. Indeed our whole social fabric and structure are being modified under this growing power. Industry is more and more being regarded as fundamental in the life of the community rather than incidental to it.

The force of this movement is inducing us to change our outlook and ideas in all directions. In our practical every-day affairs, it is encouraging us to want more of this world's goods and yet to have more leisure; to do less manual labor and yet to receive more in return for the labor we do. It is enticing us to cultivate new methods of spending and investing; to develop new ideas of thrift and bolder plans of corporate action—thus are growing greater outlets for the courageous instincts of mankind in industrial ventures that circle the globe.

Probably never before have a people benefited so fully from the labors of industry as have the people in America today. According to Herbert Hoover:[1] "Today the vast totals of production and consumption as set forth in the columns of daily statistics indicate for each group whether it be common labor, professional men, farmers, artisans and others, the highest standard of living and the greatest degree of material comfort for each of them in any country at any time in the history of the entire world. Not all of these groups have marched parallel with each other. For instance, agriculture has fallen behind the march of industry in latter years."

In a more abstract way, this growing influence of industry is a power that is teaching many of us to be less isolated mentally, to seek broader interests, and to be tolerant of unity in larger spheres of activity. Today the notes that ring out above all others are a new vigor and a new enthusiasm born in the deeper concept of the more fundamental character of industry in the life of the community.

The Other Side

But in all pictures there are shadows. Sheldon[2] interprets the chief danger of industry as a lack of a plan —a goal. He says, "As the barque of industry grows daily more heavily freighted, and ploughs through seas of increasing storminess and danger, the task of steering that barque is proportionately increased in complexity and responsibility. . . . The danger for management is a lack not of activity but of a plan of action." The great need, as he points out, is for "some definite goal."

In its broadest sense, this lack of a plan of action, a definite goal, seems to be the common danger especially to

1—Hoover, Herbert. Foreword in A Century of Industrial Progress.
2—Sheldon, Oliver. Philosophy of Management.

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A good barbecue, like this one at a corn demonstration in Craven county, North Carolina, would help any demonstration.

A Viable Agriculture

By F. H. Jeter

Agricultural Editor, North Carolina State College

DOWN here in the Old North State, one hears a lot now about soil improvement and soil fertility. The public press carries much interesting material about it. Occasionally there will be a burst of local enthusiasm over some fine pasture campaign conducted successfully, and photographs of a vigorous citizenship engrossed in consuming huge quantities of well-cooked pig, prepared in open-air barbecue style, will adorn the columns of our favorite papers. County boards of agriculture and their county farm agents announce with pride that carload after carload of valuable legume seed have been ordered cooperatively and distributed. Plans for rotations of crops are made public, and the premeditated growth of forage crops to supply an expanding livestock industry is commented upon in friendly gatherings of those who hold North Carolina's farming industry to be the supreme concern of the State.

Where so much of this occurs day after day, there must be an embryo of accomplishment. I, personally, would not like to be considered a rah, rah boy, ready to do or die for dear old Yalvard, because the fact is that I put much of this in the papers myself. But this I do know — North Carolina farmers are thinking in terms of acre yields, profit per worker, cost of production, and similar phrases meaning little in the past but now very real and, as the seedmen say, viable.

The North Carolina Experiment Station knows its fertilizers. Its agronomy workers have accumulated probably as much valuable and definite data about the response of soils and

crops to plant food ingredients and mixtures as any station. The farmers of the State believe in fertilizers and know that the use of such aids to crop production is profitable. Now they are learning that a combination of fertilizers with manures, with legumes, with crop residues, in crop rotations, with pastures, livestock, and forage supplies will balance farming and will increase acre yields.

As stated, the agronomy folks and the farmers believe in fertilizers. Professor C. B. Williams, head of the department of agronomy at State College, has been in his present job for a long time and he has more valuable data about fertilizer materials than he will ever publish. In a recent study he found that the 34 counties, which coincide closely with the area where cotton is grown, constitute about 53 per cent of all the land in the State devoted to the growth of crops each year. This same area has 49 per cent of the total value of the farm lands; it has 47 per cent of the value of farm buildings and 47 per cent of the total value of all implements and machinery used in the State. This same area produces 61 per cent of the total value of all farm crops and uses 73 per cent of all the fertilizer purchased.

Mr. Williams goes into other and more tedious analyses in this study using smaller groups of counties in the area and finds, for instance, that nine counties spend more than a million dollars for fertilizers; that Wilson county which spends the highest amount for fertilizers per acre for all land in crops also has the highest total value of crops ($12.12 is spent for fertilizers and $81.18 returned in crop value); two counties which spend the least for fertilizer ($2.96 and $2.99) get the least back in crop value ($32.70 and $28.75); and as to the type of citizenship in these counties, he says that in the past 50 years, 60 per cent of Carolina's great Governors came from the better areas.

So while North Carolina spends money for fertilizers, the money is wisely invested and the returns are commensurate with the amount used.

Demonstrations Convince

Looking into the future, one could perhaps say with certainty that because of the new kind of farming being done in the State, fertilizers will pay still better in the future. Demonstrations seem to confirm this forecast. E. C. Blair, extension agronomist, has charge of the soil fertility demon-

Fertilizer made this difference in cotton in Hertford county, North Carolina.

strations and when he studied the reports of county agents last fall, he found that these field men conducted 284 definite fertilizer demonstrations. Most of these proved the value of good fertilizer mixtures and they proved also that building up the soil fertility by the use of legumes permitted a more economical use of the commercial materials. Then, Mr. Blair found that nearly every county agent was called upon, time after time, to make fertilizer recommendations. It may be, as some say, that the farmer heard the recommendations with care and then took what his dealer happened to have on hand at the time. That may be true, but it would appear reasonable to suppose that many of these farmers asked for the kind of fertilizer recommended and thus probably caused a slight change at least in the dealer's buying habits.

Why do I think this? Because the county agent of one county reports that 75 per cent of the farmers in his county have improved their fertilizer practices with cotton since 1924.

See how Tom Broom, county agent of Union county, and beloved by us all in Tarheelia, brings about these changes:

"The outstanding achievement in soil management this year," says Mr. Broom, "is the elimination of rust in cotton and frenching in corn. This was accomplished through the more liberal use of potash in the fertilizers. Previous tests had shown us that we were not using enough potash, so early in the year, we began a campaign for a more liberal application of the material. For special soil types, we recommend 5 per cent, 7½ per cent, and even as high as 10 per cent of potash in the fertilizer. We had calls from many farmers to visit their farms and advise for their crops on different fields. This we did as far as time permitted. Otherwise, we consulted a soil map, located their farm, determined the soil type, and advised accordingly. We called upon the fertilizer dealers and secured their cooperation in putting into the hands of farmers the quality of fertilizers recommended by us. A large percentage of the farmers did their own mixing and they used 200, 300, and 400 pounds of muriate of potash to the ton, as the soil type demanded."

Those who follow "trends" and "weight" their figures according to mathematical formula, will have a hard time laughing this off for it is

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C. V. Elliott of Columbus, North Carolina, believes in diversified farming. On this piece of land in 1928 he grew oats, corn, and cow-peas. He keeps his land growing something the year round and is sure to include two or three legumes in his rotations.

Glancing Ahead *at the* Markets

By Arthur P. Chew

PROBABLY half a million farmers in the United States grew potatoes for sale in 1928, and most of them lost money on the crop. Potatoes at the farm averaged only 56 cents a bushel on November 15, compared with 95 cents on November 15, 1927, and $1.41 on Nov. 15, 1926. The price slump was caused by overproduction, but what caused the overproduction?

It would be easy to answer in terms of acreage and yield. Our 1928 potato acreage was increased about 10 per cent beyond normal requirements; the yields averaged 121 bushels an acre, against 115 bushels the previous year. It is estimated by the U. S. Department of Agriculture that two-thirds of the excess supply resulted from overplanting, and the remainder from exceptionally favorable weather conditions.

This explanation, however, does not carry the chain of causation far enough back. It does not suffice to show that our farmers lost money on potatoes last year chiefly because they planted too many. It is equally necessary to explain why they made this mistake, for acreage is the controllable factor in farm production and its rational control is the indispensable condition of profitable farming. What applies to potatoes in this regard applies to practically all farm crops. Overproduction, in so far as it results from wrong planning, is destined to remain with us until we understand why farmers misjudge the consumer's requirements.

The Department of Agriculture offers a simple if none the less startling explanation. It attributes the over-expansion of acreage and the overproduction of livestock to the tendency of farmers to plan their acreage and their livestock breeding on the basis of *past* instead of *future* prices. This doctrine obviously involves the assumption that future prices can be approximately known, and the purpose of this article is to examine some of the evidence in favor of that assumption. Farmers are inclined to scout the possibility of price-forecasting chiefly on the ground that unpredictable speculative influences and also the exactions of middlemen have much to do with prices. But this view is not supported by statistical research.

Skepticism Is Natural

Another view widely held among the farmers, the fallacy of which will appear in a moment, is that government economists and statisticians who could forecast prices would use their knowledge to enrich themselves, rather than to help farmers plan their work. The error here is there is something esoteric about price-forecasting, which must afford a great advantage to the initiated insiders. As a matter of fact, the process far from being based on secret information, necessitates the world-wide collection and dissemina-

tion of market news. It is not magic, voodoo, or any sort of hocus-pocus whatever, but science.

Skepticism about price-forecasting is natural and indeed praiseworthy, for the technic is still in an early stage. Excessive faith in market predictions, at least for the present, might do harm. But ignorant skepticism is as bad as ignorant credulity. Skeptics who investigate the matter will find that the Department of Agriculture, in its annual outlook reports and in other official publications, has anticipated important price movements for several years with only a small percentage of error. This function, though publicly done and widely known, has been vigorously criticised, and some of its practitioners have accordingly advised cloaking it under some fancy name. It has been suggested, for example, that the government economists should talk about predicting supply-and-demand prospects, rather than about price forecasting. One suggestion is that the phrase "statistical inference" or "inductive inference" should be substituted for the plainer term "forecasting." Dr. O. C. Stine, head of the Department's statistical and historical research division, has no use for such suggestions. Academic highbrow labels for common things, he says, may avert criticism but will not promote the popular understanding necessary to further progress in the work.

Better to Look Forward

It has been demonstrated by the Department's outlook reports that estimates of future prices are a safer guide than knowledge of past prices in the adjustment of farm enterprises. The 1928 potato situation is a typical case. Had the farmers looked forward instead of backward in planning their potato acreage, they could have averted a disaster. Under average weather conditions, 3,500,000 acres planted to potatoes will produce about 400,000,000 bushels, or as large a quantity as can usually be marketed. The growers planted 3,825,000 acres. They did so because three successive years of high potato prices had made them over-optimistic. The Department of Agriculture issued warnings in January and March and again in May against the over-expansion of the potato acreage, but these warnings had no effect.

Agricultural price forecasters do not pretend to measure supply and demand with absolute accuracy. They allow for a margin of error, both in the statistical record and in their interpretation of the statistical material. Price forecasting is based essentially on the assumption that the various price-making influences will act in the future about as they have done in the past. This may not always work out. It is therefore well not to be too cocksure in making predictions. It is certainly possible, nevertheless, to anticipate price trends in the main, and in the case of some products to be fairly specific. Economics is thus beginning to rank with the other sciences in power to make predictions based on quantitative measurements.

Its progress in this direction is based of course on the growth of statistical data. Anyone knowing the conditions under which such growth takes place will immediately recognize the absurdity of the assertion that if government economists had the power to predict prices they would use it for their personal advantage rather than for the benefit of agriculture. That idea comes from a mistake akin to the one people made in talking about the weather man. There is of course no individual weather man. Weather forecasting is a cooperative job, requiring the services of a virtually world-wide meteorological reporting system. World data must be assembled before a scientific 36-hour forecast can be issued in a single locality.

It is the same with price forecasts. Four hundred thousand voluntary crop reporters in the United States and a host of government officials at home and abroad aid in gathering the

data necessary in forecasting market trends. The information obtained is never kept secret, but is published immediately. Even the final interpretation of the information after it has been condensed requires the cooperation of a large corps of economists and statisticians.

In the preparation of the annual outlook reports, committees representing not only the Department of Agriculture but state agencies and colleges of agriculture are appointed to deal with each crop. The whole outlook report is finally gone over at general meetings attended by all those who have had a hand in the earlier stages of the work. In short it is impossible for an isolated individual to make a worth-while agricultural price forecast. The task is really an unusual example of the effective subdivision of labor, with the final result representing the consensus of many experts.

The hobby of this little lady of the circus is poultry. She probably doesn't have to worry much about marketing chickens like these.

Economics, it is sometimes declared, is not a science, but merely a collection of disputed opinions. Modern statistical methods are removing this alleged inferiority. The economist can not control his material as the chemist or physicist does, since he must draw it from the living, changing world. He therefore still is obliged to mix hypothesis with his facts in a rather large proportion, in which respect his fault, if it is a fault, differs only in degree from that of scientific workers in other fields. But the relative position of theories and facts in economics is changing. Statistical research is accumulating a vast body of measured, established facts, from which the economist may draw inductive generalizations. In this field it has ceased to be arguable that one opinion is as good as another.

The familiar law of supply and demand has been the subject of the most extensive effort to supplant hypothesis with verified knowledge. No longer is the economist content to say that prices will go up or down under certain conditions; he undertakes to say in many cases how much they will go up or down. This is made possible by accumulation of data showing how the commodity markets have reacted to supply-and-demand changes in the past. Separate measurement of the different factors in the supply-and-demand relationship has been carried to a surprising degree of refinement. It may never be possible to develop a method of forecasting that will leave no room whatever for differences of opinion, and consequently, for speculation as to the probable course of prices. But knowledge can supplant uncertainty.

Lay critics of the Department's price analysis work sometimes aver

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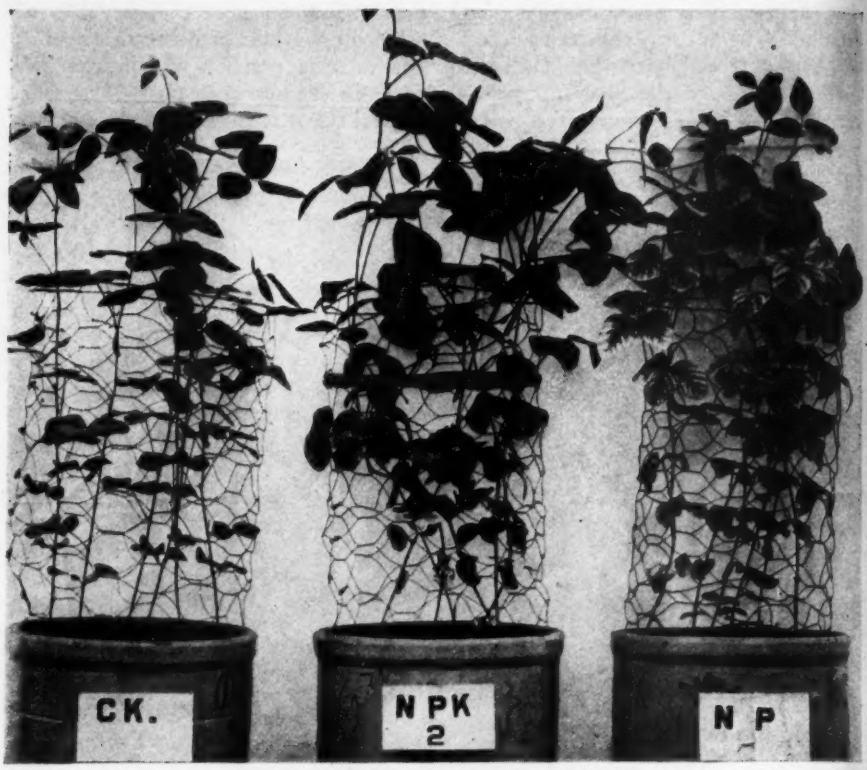

The untreated soils (ck) produced slender plants with small, slightly chlorotic leaves. The nitrogen and phosphorus in combination (NP) produced greater growth and larger leaves but the leaves were badly affected by chlorosis. A complete fertilizer (NPK) applied after chlorosis appeared prevented its further development. The line drawn on the photograph shows the development before and after application of fertilizers. Note the lighter areas of the leaves are chlorotic symptoms.

CHLOROSIS

By G. L. Schuster

Agronomist, University of Delaware

OCCASIONALLY farm crops turn yellow and ripen early with a resulting low yield of inferior quality. This condition is not anything new. Agricultural research workers have been concerned about it for some time. In order to distinguish between this early pseudo-ripening period and the normal ripening period the term chlorosis has been applied to the first condition.

The general symptoms of chlorotic plants are as follows:—A general lightening of the green color, turning to yellow, in the leaf areas farthest from the major veins, and becoming more extensive as the condition advances. As it advances, the veins remain green, thus giving a characteris-

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Plants fertilized with nitrogen and phosphorus made greater growth than the untreated plants, but were chlorotic.

Plants fertilized with nitrogen, phosphorus, and potash showed greater growth than any of the others, and no chlorosis.

Beardless Barleys

By E. N. Bressman

Plant Breeder, Oregon Agricultural College

THERE are at least six new smooth-bearded barleys. One of the newest is known as Comfort, and was originated by the Nebraska Experiment Station, at Lincoln. The Nebraska Experiment Station has found this new barley to be high in yield, as well as free from the objectionable barb.

The Wisconsin Experiment Station has a smooth-bearded barley, known as White Barbless. It is not only high yielding and barbless, but also resistant to the disease known as stripe.

The Minnesota Station has developed a new barbless variety, known as Velvet. This variety is now being grown rather widely in both Minnesota and Iowa, where it has given good results. The Minnesota Station has another barley with smooth awns known as Glabron. In addition to smooth awns and high yields, it has a stiff straw.

The Michigan Station will distribute in 1929 a new smooth awned, two-rowed barley known as Spartan. Another smooth-bearded barley which has been grown to a very limited extent in some of the western states is known as Flynn.

The trend in barley breeding work is to develop new varieties that have smooth beards. There have been some attempts to develop barleys with no beards, or at most a small projection at the top of the kernel known as a hood. Most of these hooded developments, however, were either low in yield or shattered very badly.

The relation of the barley beard to the yielding ability of the variety is of interest. Work done at the Minnesota Station nearly a decade ago showed that there was some connection between the beard of the barley and its yield, particularly under humid conditions. Additional work has shown that there is a relation between the beard and the giving off of water from the kernel. Still other work has shown that there is some relation between the beard and the ash content of the kernel.

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Beardless barley does well in the West, but not under humid conditions.

More *and* Better Melons

By E. R. Lancashire

Extension Specialist, Ohio College of Agriculture

ONE rainy day last spring a group of melon growers met in a barn near Wilmington, Ohio. County Agent Hall had called them together to see what could be done about putting up a melon of better quality.

The extension service of Ohio State University was called on to explain why melons lost that fine flavor which makes them so tasty. These men knew that one good first-class melon sold several more. They knew, too, that melon troubles were multiplying in Clinton county.

The specialist talked their problems over with them, and one man in particular had the courage to follow up the system outlined. He, as a neighbor put it, is spending his winter in Florida.

So successful was this man in capturing the elusive quality factor that people would collect about his delivery truck whenever it stopped in a town or city within the radius of his melon field. This may have been partially due to a large sign which he had placed on the truck. A well-worded sign will attract a buyer, but only quality in the melon will cause an epidemic of repeat orders. To corner the market, one need only produce a better quality melon than can be secured elsewhere.

This particular grower had 14 acres of melons last year. It was a pleasure to look at the field. His methods were those which will work for nearly any farmer who wants to grow melons. He learned how to keep the vines healthy, at least enough vines remained that way to secure the desired results.

More than good seed and cultural care are included in his system. Two items of real merit were added to his usual thorough program. These were insect and disease control methods.

The cucumber beetle is the chief insect attacking the melon here in Ohio. The melon vines were kept well covered with a calcium arsenate-gypsum dust from the time the vines first appeared until blight was noticed on the leaves.

This dust was applied in very liberal amounts to the ground about the young plants as well as to the plants. The early protection of foliage with this dust was especially necessary because the cucumber beetle is the winter home of the bacterial wilt disease which attacks muskmelons. This disease is often the cause of the vines dying about the time the melons are nearing maturity. Control of the cucumber beetle results usually in a control of the bacterial wilt.

Home-made Dust

This gypsum-arsenate dust is made by mixing calcium arsenate and gypsum together at the rate of one part of the arsenate to twenty parts of the gypsum. Hydrated lime is not a substitute for gypsum chiefly because there is less danger of foliage injury with the use of gypsum.

This dust is mixed by placing the two ingredients in a lard can or in a churn and rolling it back and forth for from five to ten minutes. The

well-mixed dust applied with a dust gun or by shaking the dust over the vines through a gunny-sack at the right time and in sufficient amount will usually solve the cucumber beetle problem.

Leaf blights and other foliage troubles are often controlled by the use of a copper lime dust. As soon as the first signs of such trouble appear, the use of the gypsum arsenate dust is discontinued, and a new dust is mixed and used.

The new dust is a mixture of 20 parts of monohydrated copper sulfate and 80 parts of a hydrated lime. In case 100 pounds were to be mixed, one would use 20 pounds of the copper dust to 80 pounds of the lime. If the beetles were still active, the grower could replace five pounds of the lime with five pounds of the calcium arsenate, and the resulting dust would be a control for both beetles and blights. Those who are not sure when the disease factor is likely to appear can begin using the copper-lime-arsenate dust before the symptoms are seen and thus prevent foliage injury.

The copper lime dust is applied to the under side of the leaves, because it is there that these diseases enter the plant. Apply the copper-lime-arsenate dust when there is no wind blowing and while the vines are damp with dew or just after a rain.

A thin layer of this dust will usually give control if applied every five days and after every rain from the first appearance of blight until after the crop is almost finished. From 20 to 40 pounds of the dust are needed for each application.

There are two or three types of dust guns which the grower can operate by hand. The more expensive ones are either of the bellows or the crank type. Each has its advocates. Some prefer the crank type because it is said to be easier on the back. The bellows type can be operated at will, whereas the crank type usually is cranking out a continuous stream of dust. Then there are power and traction-row crop dusters for those who do not choose to use the hand machine.

The remedy sounds like work. The sound is not deceptive. Real work and expense are involved in the production of a super-quality melon.

Dust alone will hardly turn the trick. Good seed and well-grown plants, properly fertilized and otherwise cared for are always first requirements. Dust, intelligently applied, is but a kind of insurance which the grower takes out to protect his investment in seed, fertilizer, labor, and other charges such as rent for fields and all other items which make melons so expensive to produce.

Fertilizers Next in Importance

The grower of such an intensive crop as muskmelons can protect the vines against insect and disease injury if he is equipped and willing to do the amount of work required. Bringing these vines to the blooming stage at just the right rate and type of growth is another matter. The proper fertilization of the melon field is the next item in importance to that of keeping the foliage healthy until the crop is matured.

A quick start is desirable for the germinating melon seedlings. This speeding up of the growth rate is best brought about in such a way that there will be little if any available free nitrogen remaining at blooming time.

A quick start followed by a well-balanced vine growth secured through the liberal use of a high-analysis, balanced fertilizer will usually prove most profitable. Where fertilizer is placed in the row, it is suggested that 500 pounds per acre of a 4-12-4 be used. The more favored way, however, is to use from 1,000 to 1,500 pounds of a 4-12-4 applied broadcast just before the seeds are planted. In

Proper insect and disease control, together with the right fertilization, will insure the quality of melons.

addition to this the use of 200 pounds of ammonium sulfate or nitrate of soda per acre is favored. This additional fertilizer is best worked into the soil around the hills about three weeks after the seed are planted. The theory is that the nitrogen in the 4-12-4 will carry the seedlings very well for the first three weeks of their growth. The top-dressing of available nitrogen can be given as soon as the grower thinks the original supply is exhausted, about three weeks usually.

Thirty to fifty pounds of available nitrogen expressed in terms of nitrate of soda means from 200 to 330 pounds of this chemical. Where sulfate of ammonia is used, the equivalent of the same amount of available nitrogen is 150 to 250 pounds. From thirty to fifty pounds per acre of available nitrogen is often advised for top-dressing melon plantings. A fine opportunity awaits the melon grower who will try out the use of nitrogen in connection with the melon crop in the way described.

No one can tell a grower just exactly what fertilizer or how much of it should be used for any particular crop or on any particular soil. Experimental work on the part of the grower is needed. The information presented here is given in the way of a basic fertilizer treatment, a sort of starting point for the grower who is desirous of trying out some experimental work with this particular crop.

For any soil containing an abundance of organic matter only commercial fertilizer is needed. Too much nitrogen will produce a rank vine and usually a poor set of under-developed melons. To guard against this condition the grower can use enough mineral elements to balance the nitrogen. Superphosphate and potash are needed in liberal amounts. From 8 to 12 per

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Worth While Fertilizers

By Lee Van Derlinden

WORTH while crops in regions even of moderate rainfall need fertilizers. No matter how good the crop grown, it would have been better if the right combination of plant food had been applied.

I can see the county agents in Iowa, Wisconsin, and in other states all over the United States smile at this statement. What is a worth while crop? If it is wheat, it should be the maximum number of bushels that can be produced on the acre. It should weigh over 60 lbs. per bushel, and the kernels should be plump. There is no particular reason why our farmers should be content with less than 30 bushels, and the figure really should be larger. Yields of 50 bushels per acre in Indiana are not exactly common, yet it frequently happens that a Hoosier farmer gets such a yield.

Farmers have six per cent interest to pay on their investment, the same as the business man. Then why not emulate the business man and try to get the very most out of the investment. The farmer doesn't, partly because he has come to regard wheat sown in the Fall not as a crop itself but as a necessary evil—a nurse crop for clover or grass crops. He has his mind on the clover, not on the wheat crop; he thinks the wheat crop is a gamble anyway. Isn't the clover crop a gamble also? But clover must be grown, and so he throws in a wheat crop to help the clover along; it is clover insurance.

The writer has discussed this matter with thousands of farmers in the Midwest during the past six years, and in most cases farmers say they would not grow wheat if it were not for the purpose of "catching" the grass crops.

Wheat is an important crop in the Midwest. It should receive individual attention, the same as any other crop does. It needs a great deal more plant food than it gets. Suppose the farmer uses 200 lbs. of a 2-12-6 per acre. This is 4 lbs. nitrogen, 24 lbs. phosphate, and 12 lbs. potash—40 lbs. in all on a whole acre.

Wheat is sown in the Fall following corn or some other crop, seldom on land that has not produced a crop the same year. It needs more than 40 lbs. of plant food. If it needs nitrogen at all, it needs more than 4 lbs., and the same is true of potash and phosphate. The wheat crop must divide the fertilizer with a new growing clover crop and some of the plant food is bound to leach away.

Enough for Results

How many farmers in the wheat growing states use 200 lbs. of a 2-12-6 per acre? The average application is more like 125 lbs. If 125 lbs. per acre are used this means that but 2½ lbs. nitrogen, 15 lbs. phosphate, and 7½ lbs. potash are used, a total of 25 lbs. of plant food per acre supplied for the wheat and clover crops. This is not enough to insure worth while results. It would be better if it were a 6-32-12.

Potash and phosphate are comparatively cheap elements of plant food. Nitrogen must be used in many cases, but it can be grown on the farm much more reasonably than it can be

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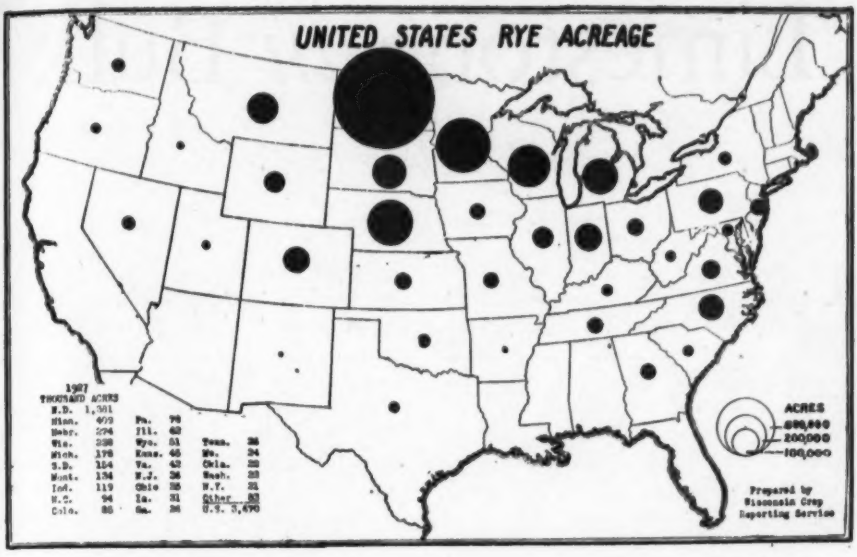

RYE

¶ *Sixth of our crop series*

By Walter H. Ebling

Agricultural Statistician, Wisconsin

AS a small boy, I had to assist in harvesting grain on my father's dairy farm. Because of its stiff straw and great size, the rye crop was always objectionable. The bundles were often bigger than I was, and the handling of them was trying indeed.

The bulk of the world's rye is produced and consumed in Europe, Russia, Poland, Germany, and France being the leading growers. The United States grows only about 3 per cent of the world's acreage. In Europe it is mostly a bread grain, but in the United States it is grown largely as a feed crop. Even in Europe, however, the use of rye as a bread grain is reported to be declining gradually since the war as more wheat is used in its place. Nearly all of the rye produced is of the fall-sown type.

In the United States the acreage, though widespread, is quite largely confined to the northern states, North Dakota leading both in acreage and production. In recent years there has been a westward shift of the rye acreage and since yields per acre tend to be higher in the eastern and corn-belt

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Limestone *in* Bulk

By J. Robert Hall

County Agent, Linneus, Linn County, Missouri

IF you want to supply a whole county with lime, get your railroads, bankers, farmers' cooperatives, clubs, and exchanges, commercial clubs, and Farm Bureau to help you. This is the way to do a big job well. We have tried it here in Linn county where every acre of upland needs lime, and it has worked to the advantage and profit of farmer and all.

It pays well for one farmer to cooperate with another. It pays for many farmers to cooperate, and it pays still better for these to cooperate with all business interests.

At one time we had a grave fertilizer problem. It has been solved by our clubs, exchanges, and cooperatives buying by the car. Most of our soils need some fertilizer. They all need some lime—that is to grow legumes successfully—about two tons per acre.

No one wants to lime his whole farm in a couple of days, so no one could lime at all unless he went in with his neighbors, and they were not always ready to unload a car the day it came. Damage and loss of valuable time in a busy season often resulted from liming under this antiquated system. For three years it has been different here.

At one of Missouri's famous Clover and Prosperity meetings, when all Linn county turned out to discuss our soil fertility problems, this plan resulted. It grew out of a universal need for legumes. Necessity was, is, and always will be the brooder of success. It was legumes or no soil. It was lime or no legumes. So all needed agencies agreed to cooperate to put the big job of supplying lime by the pound or by the car at the minimum cost to every station in the county. Now a farmer taking hogs or wheat to town can take back a load of lime, he can haul it in his leisure, or spread that alfalfa field white whenever he wants to sow.

Nearly everyone can afford a little time each year for his sour soil's sake, and even if he needs a large amount,

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This is one of the poorer bins, which nevertheless is very practical.

County Agricultural Agent Jesse Wood of Martin county, Indiana, with his eight gold medal winners in the Indiana Five-Acre Corn Contest. There were eleven contestants entered in this county, all of whom won medals and eight of whom made the 100 bushel corn club. From left to right they are Jesse Wood, County Agent; C. C. Vanhoy, Loogootee, 101.8 bu.; John F. Larkin, Loogootee, 102.45 bu.; Harry Tedrow, Shoals, 113.28 bu.; Elvis Jones, Shoals, 117.92 bu.; Walter Jones, Shoals, 120.68 bu.; Wilson Chenoweth, Shoals, 101.71 bu.; seated in front D. K. Williams, Huron, 127.10 bu.; and Wm. G. Nikam, Shoals, 107.84 bu.

Winners *of* Gold

By Chester P. Allen

West Lafayette, Indiana

DRIVING through Martin county, Indiana, up one hill and down another, one sees bright prospects for a bumper crop of hoop-poles, blackberries, and rabbits, but little hope for large yields of worth while crops such as corn, on these farms which seem to be standing on edge.

However a check of records turned in by the 845 entrants in the Indiana Five-Acre Corn Club contest, which was conducted under the auspices of the Indiana Corn Growers' Association in cooperation with Purdue University, shows that of the eleven contestants from Martin county eight of them were gold medal winners, meaning they produced more than 100 bushels per acre. Not only did more than 75 per cent of the county entrants win gold medals but these men captured second, fourth, fifth, and seventh places in the battle for highest yield honors. This is the second time during the past three years that Martin county has taken second place and year before last it took first honors.

Donald K. Williams, whose farm is nestled in a little valley cut through the hills by the east fork of White

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Profit *in* Late Cabbage

By A. E. Wilkinson

Vegetable Specialist, Connecticut Agricultural College

MY good friend, Mr. John T. McKnight, of Ellington, Connecticut, has learned to grow approximately 20 tons of Danish bald-head cabbage on an acre. Mr. McKnight is a dairyman in a tobacco-vegetable section. Whether he was contaminated by the vegetable growers more than by the tobacco raisers is unknown, anyway he has been raising late cabbage very successfully.

Having an excellent dairy, he has been fortunate in having stable manures to apply on his land. Approximately 15 tons per acre have been used broadcast. In addition 1,000 pounds of a high-grade fertilizer have been used; the 5-8-7, the common fertilizer in Connecticut, being the one selected.

All of this good farmer's land is in systematic rotation and in a high state of cultivation. Any added fertilizers must force a crop to produce. This, of course, then is one of the principal foundations on which his success in late cabbage raising rests.

Mr. McKnight obtains the best strain of late cabbage that is known, one that has produced elsewhere 20 tons or more per acre and one that he has tested enough to know that it will give him approximately that same yield on his farm.

The crop is not an expensive one to raise as the seeds are sown in rows on the side of the specially prepared field. When the seedlings have reached the height of 6 to 7 inches, they are immediately transplanted to their permanent field location by using a horse-drawn transplanter. The coarse transplanter used by tobacco men is used by Mr. McKnight. Setting an acre of cabbages with one of these machines is a matter of about 3 to 3½ hours' work, or a little longer if things do not run smoothly.

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This is the way Mr. McKnight knows that he gets 20 tons per acre.

PICTORIAL

Fifteen - year - old Vera Hill of Yakima V alley, Washington, provides a regular orphans' home for motherless lambs. She feeds them from a baby's milk bottle which entails a lot of work and individual attention. However she enjoys it, and the nice profit which these lambs return in the fall compensates her for all of her trouble.

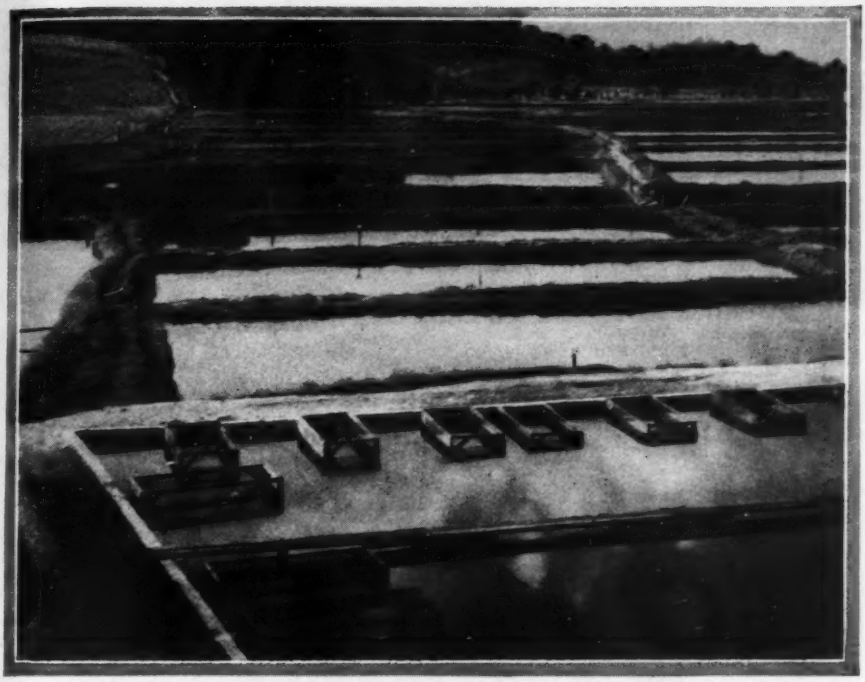
This Chester White sow on the farm of Henry Butz near Rossville, Indiana, has been provided with a clean place to give her fine litter of eleven a sun-bath.

William Parker of Los Angeles likes the unusual in the way of pets, and proceeds to train them in the most unusual manner. Bozo, a goose which he has trained to do almost everything except talk the English language, is covered with a $10,000 policy. Bozo is shown with Miss Beatrice Lopez who doctored him through a recent illness.

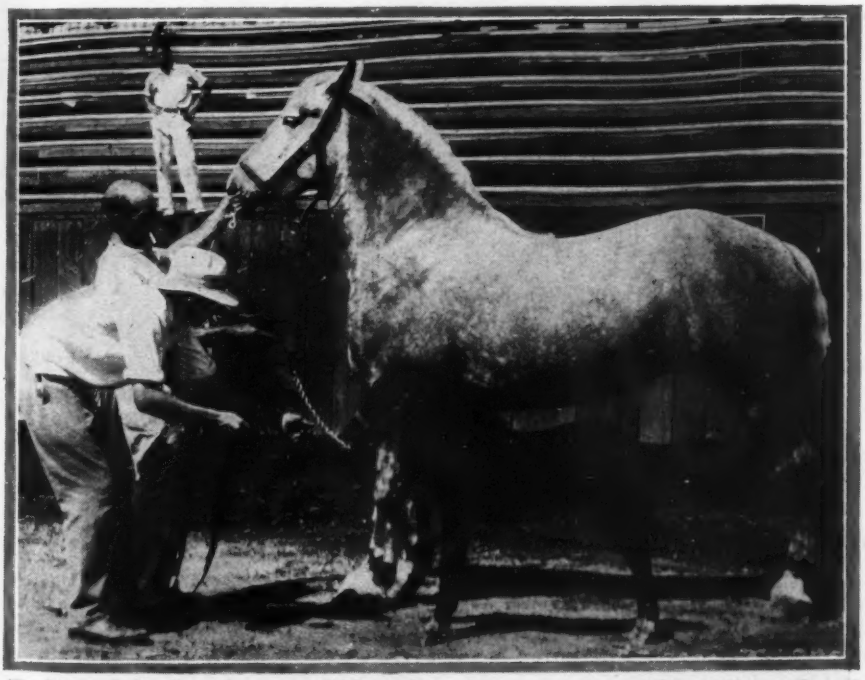
The old biddy looks as though she were doing her utmost to beat the size of the pig family opposite. We'd say she had a bit over-estimated her ability.

This monument was erected by the Pennsylvania State Horticultural Association in 1920 to the York Imperial apple, first propagated about 1820 in this orchard on Springwood Farms, York, Pennsylvania.

A scene, prepared by the U. S. Department of Agriculture for the Ibero-American Exposition at Seville, Spain, represents the landing of the first livestock introduced into America by early Spanish explorers.



Where do all the gold-fish come from? Here is one answer. Above is a gold-fish farm located near Martinsville, Indiana, which yearly supplies large quantities of these little "ornaments."



The long and the short of a recent California horse show were Queen, weighing 2,060 pounds, and Demi Tasse, weighing 60 pounds. Queen, true to her sex, looks a bit indignant over the comparison.

A winning smile, laughing eyes, and curly hair are good bait for hearts.

The stockholders of the live bait industry hold a meeting on quality.

The Editors Talk

Coordinating Advice

The extension forces of the State Colleges of Agriculture, whose responsibility it is to give information to the farmer, now number several thousand. This extension work has been a phenomenon of rapid growth and development. For instance, there was recently celebrated at Houston, Texas, under the auspices of the Association of Southern Agricultural Workers, the twenty-fifth anniversary of the first appointments of county agricultural agents. There are now about 2,500 such agents in the United States.

Coincident with this remarkable growth of the extension forces, industries serving the farmer have organized advisory forces. It is only natural and to be expected that in work that grows rapidly in two separate fields, there will inevitably arise the need for coordination of advice and information. We are, therefore, very glad to reprint an editorial from the "Fertilizer Review" of April this year, which discusses meetings between industry and the extension forces that have been held for this purpose.

SEEK TO COORDINATE FIELD WORK OF VARIOUS FERTILIZER AGENCIES

The effort to develop a greater degree of cooperation between the various units of the fertilizer industry in demonstrational and experimental endeavors was given added momentum by the recent request by Dr. C. W. Warburton, director of extension work of the U. S. Department of Agriculture, for a joint conference of representatives of State and Federal Extension Services and of the fertilizer industry.

Members of the staff of The National Fertilizer Association had anticipated the situation which prompted Dr. Warburton's request, having arranged for a conference of directors of the agricultural staffs of all of the fertilizer raw materials companies and of the Association, which was held January 10. A second conference was held on March 25. The joint conference with the Extension Service was held on March 26.

In the industry's meeting on March 25, the group decided that cooperation between agricultural workers within the fertilizer industry is highly desirable, that cooperation around individual projects is the most feasible, and that a permanent committee should be organized to insure coordination and continuity and to serve as a clearing house for ideas and suggestions. The recent successful effort between different fertilizer organizations to conduct pasture demonstrations in the Northeastern States was cited as an illustration of what can be done by such cooperation.

In opening the joint conference, Director Warburton pointed out the need for coordination of effort in conducting demonstrations

and various kinds of prize contests. These matters were discussed from many angles and the decision was reached that a second joint conference should be held in the near future, when it is hoped that some definite policies may be agreed upon. This second joint conference will be between representatives of the Committee on Extension and Research Organization and Policy of the Association of Land-Grant Colleges and a committee representating the various units of the fertilizer industry.

This is an excellent move in the right direction. It is to be commended. It will be of great benefit not only to the groups concerned, but to agriculture as well. It is to be hoped that definite and practical plans of continuous coordination can be evolved as a result of these initial meetings.

Farm Relief

Farm relief is the basis of much discussion throughout the United States at the present time. Turning from the conflicting arguments of the experts on the good and bad joints of various programs and measures of relief, we are glad to read in the Purdue News Service the following statements of Professor G. P. Walker.

"The value of land is determined largely by what it can be made to return in profits. With prevailing systems of general farming in Indiana, labor, taxes, and interest on the farm investment make up most of the cost of producing each acre of crops. These cost items can be influenced but little by the farm operator and the prices for the things he has to sell are fixed by conditions over which he has no control. These cost items are increased but little when larger yields per acre are produced as harvesting the extra produce is the principal item of increase. Soil treatments that raise crop yields more than their cost are the most effective means of increasing returns and raising the productive value of the land.

"Experiments on a number of important soil types in Indiana show that intelligent liming or fertilization or both raises yields to the point of increasing profits and gives substantial boosts to the productive value of the land."

Here we have a plain, common-sense method for the farmer to help himself. He can hoe his own row and not be dependent upon the whims or ideas of others. These are only good business ideas and as such deserve careful consideration by the farmer who is really progressive and desirous of improving his situation.

When competition in industry becomes keen and profits fall or disappear, the first remedial step is always the same. The industry seeks to lower its production costs. Reducing production cost per unit without sacrificing quality means greater profit. This has been done time and again and nowhere with more outstanding results than in the automobile industry.

Why not let the farmer take a lesson from this and follow suit? The farmer has complained that he cannot make enough money from his land to show a profit. Professor Walker shows that by increasing his yields by the comparatively inexpensive practice of fertilizing and liming, the farmer can

increase the productive value of his land enough to make a profit. The fact that many farmers already have solved their difficulties in this way speaks for its practicableness.

It cannot be claimed that the above is a panacea for all supposed or real agricultural ills. However, it is a fundamental factor in efficient agriculture and certainly merits attention.

Procrastination

"He who hesitates is lost." Why hesitate? That is what our county agents and other extension workers should ask a lot of our farmers who are on the verge of being "lost."

It is a human trait to postpone as long as possible the things we dislike to do or which may be unfamiliar to us. The student often will not prepare his lesson until forced to recite, nor will the farmer change from the customs of his father until necessity drives him to it. These are the people who in these days of strenuous competition are on the verge of being "lost." Why do they hesitate? That is the problem which faces many an agricultural extension worker.

In traveling through the older agricultural sections of the South, for instance, we find lands once thought to be inexhaustible in plant productiveness now so poor that crops grown on them are costing more than they will bring. Poor buildings, a dejected people, and all the other outward signs that go with poor tillage are in evidence. On the other hand, we find, often in close proximity, indications of prosperity and thrift on the part of owners of land known to be of much less natural productiveness.

We have in mind large areas of the Coastal Plain soils which twenty-five years ago were thought to have little or no agricultural value because without artificial aid they would produce little. Their owners were forced to use fertilizers from the start. Such lands today are producing better crops, and their owners are showing many more evidences of prosperity, than the average of those living on much richer soils. Many factors may be cited in an explanation of this situation, but it cannot be denied that one big one is procrastination—a hesitation to depart from the practices of our forebears.

There is an old saying that "Construction follows destruction." The truth of this is aptly illustrated by the changes now going on in a large part of the older agricultural regions of the South. It took the ravages of the boll-weevil to force the extension idea, and now this idea is fast showing the farmer how he is losing hundreds of dollars annually by failing to produce his crops as economically as possible by a more general use of fertilizers.

Regardless of what has been accomplished, we still find all over the United States farmers who are just "getting by." These farmers know, for instance, that the use of some fertilizer might double or treble their profits, yet they keep on postponing the start. They are loath to give up farming as their

fathers farmed. They put off fertilizing because they say that once started they will be forced to keep it up. It gets to be a habit.

One might think that the buying of fertilizer by the way it smells is entirely a thing of the past after the years of schooling to the contrary. This idea is becoming less wide-spread, yet a recent survey of some 50,000 farmers made by the National Fertilizer Association showed that twenty-six per cent for the country as a whole and forty per cent in the Carolinas and Georgia let the odor influence them in their purchases of fertilizers. This seems almost incredible in the present age of enlightenment, but it takes a long time to break down prejudice.

Most commendable work has been done by our colleges and extension forces toward the education of the farmer to better practices. We see the results everywhere. However, there is still much to be done, especially in defeating procrastination. Anything which will break down the "bad habits" of our farmers is a step forward in our agriculture.

The March of Industry

No one needs to collect a lot of data or figures to prove that industry is exerting a much more powerful influence in our social life than was the case even a few years ago. Material in the press and government publications, the activities of the stock market, the wide circulation of trade and technical journals, the expanding activities of scientists and scientific societies, all indicate a growing power of industry.

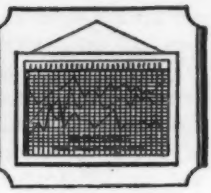
Our outlook is changing. There is a new enthusiasm and a new vigor inspiring industrial and commercial effort. Industry is changing from something merely incidental in our daily life to something fundamental. Practically every large industry is basing its work more and more on scientific research. Various books have been written to prove this in detail. There are now more than a thousand laboratories in the United States whose sole work is to conduct research work. This is drawing the scientific man from the seclusion of his laboratory to the pressing affairs of industry.

The faster the pace, the more serious the problems become. In the march of industry today, while the dominant note is prosperity, there is much that is complex and obscure. There is much activity that needs to be coordinated to a more definite purpose.

The industries that more specifically serve agriculture have their full share of problems and complexities. Therefore, the question of how the agricultural industries are availing themselves of science and the help of technical men is a matter of importance, not only to industry itself but to organized practical and scientific agriculture as well. Activity in such movements alone is not sufficient. A viewpoint and background against which the ever-increasing activities of industry in the field of utilization can be clearly seen is needed.

For this reason we believe that the short series of articles, *Industry Presses Onward*, starting in this issue of our magazine is of timely interest. It is to supply something of this background against which the problems can be seen that this series of articles is intended.

AGRICULTURAL DEVELOPMENTS



By P. M. Farmer

OBSTINATE APPLE TREES

Strong but stubborn apple trees—those that are apparently healthy yet persistently fail to bear good crops—should be made to do so by heroic methods, says W. H. Alderman, horticulturist of the University of Minnesota. The method he recommends consists in a light girdling of the trunk about the first of June. If only the thin bark is cut and the girdle is only a half inch wide, the tree will not be harmed and fruit buds will be forced out. The chances are the following year will bring a crop of apples. Another way is to bind the trunk tightly in early June with a fine wire. But, the horticulturist warns, be sure to take off the wire not later than August. Unproductive trees that are weak, he says, should not be given this treatment. They may need heavy pruning and fertilization. Or it may be that the tree lacks pollination and that the problem could be solved by planting near by some trees of other varieties.

TAKING STATIC FROM BELTS

Static electricity that accumulates on the moving belts of machines on the farm and in the factory has been responsible for many destructive fires and sometimes for the loss of life. The Department of Agriculture has developed dressings for belts which causes the electricity to be carried off and grounded. For rubber belts: Lamp black, which is finely divided carbon, and spar varnish the thinner of which consists of a mixture of mineral spirits and carbon tetrachloride. This dressing will not flame and cause a fire risk. For leather belts: A dressing made of liquid fish glue, glycerine, sulphonated castor oil, water, lamp black, and ammonium hydroxide. Details may be had from the Bureau of Chemistry and Soils.

CO-OPS NOW BUY A LOT

Farmers' cooperatives are usually looked upon as selling organizations, but studies by the U. S. Department of Agriculture show that their buying activities have grown to be of great importance and variety. Reports obtained in 1925 from more than 10,000 active farmers' cooperative associations showed that nearly half of them made purchases for their members. In 1927 farm cooperative associations bought feed, seed, fertilizer, containers, and other supplies to a total value of more than $300,000. Two farmers' business organizations that year each handled a cooperative purchasing business of more than $10,000,000 and another handled about $7,800,000 in cooperative purchases. Half a dozen associations each did cooperative purchasing in excess of a million dollars. A few years ago 62 per cent of the associations that reported bought feeds, 47 per cent bought fuel, 30 per cent bought containers, 20 per cent bought seed, 19 per cent bought fertilizers, 15 per cent bought building materials, 13 per cent bought fencing, 11 per cent bought implements and machinery, 7

per cent bought hardware, and 30 per cent of the associations bought miscellaneous commodities. A recent development has been the formation of cooperative associations for the buying of gasoline, kerosene, lubricating oil, and similar products. Forty of them in 1927 made an average saving of 10.3 per cent.

BIG MEAT LOSS

Even though the meat packer owns the animals at the time they are condemned by the Federal inspectors, he refuses to be the loser. He watches disease conditions in various parts of the country and when he locates a region of heavy disease infestation he may quit buying animals produced there. On the other hand, he now pays a premium for hogs coming from counties that the Department of Agriculture has pronounced "modified accredited areas," or, in other words, practically free of tuberculosis. The condemnation of hog carcasses alone by Federal inspectors in the packing plants of the country removes from the food trade enough meat to supply a city the size of Cincinnati, Ohio. A marketing specialist at the Ohio Agricultural Experiment Station uses this fact to call the attention of Ohio farmers to what they might save for themselves. Other States may use other cities to make the comparison and show how big the loss is and how great the gain might be.

ANOTHER CROP INSECT

When the farmer takes over a weed and makes a profitable crop of it he can feel pretty sure that before long some pest is going to find out the plant is no longer a weed and will set to work making a living off the new crop. This has happened to the sweet clover crop in North Dakota. At a recent meeting of the International Great Plains Crop Pest Committee it was reported that the bertha armyworm is becoming of economic importance in the prairie provinces of Canada and that it has become a serious pest of sweet clover, flax, cabbage, corn, beans, and other plants. Fields of sweet clover and other crops in northern North Dakota have already suffered severe damage. The insect feeds on the leaves and cuts off seed pods. The method of control so far recommended is fall plowing.

FOR BETTER CONCRETE

The proportion of water to cement is more important in securing strength than is the proportion of gravel to cement, it has been shown recently by tests made by experiment stations and others. It has long been thought that the most important factor in the strength of concrete was the proportion of gravel to cement.

Here is the new rule as given out by engineer D. A. Albrecht of the University of Illinois: As long as the mixture is plastic and workable, the strength of the resulting concrete will depend solely upon the ratio of the volume of the mixing water to the volume of cement. The first thing is to determine the strength of the concrete necessary for the use to which it is to be put. To get a mixture that will meet the requirements of ease of placing and proper consistency, the amounts of sand and gravel are varied in a test mixture until this consistency is secured. With moist sand and gravel, 6 gallons of water should be used with each sack of cement for foundation walls which need not be water-tight and for retaining walls, engine bases, and for mass concrete. Five gallons of water to a sack of cement should be used for water-tight walls or pits, dams, silos, or dipping vats, and 4 1-4 gallons of water to a sack for water-storage tanks, sidewalks, driveways, steps, and porch or basement floors. For fence posts, flower boxes, and work of thin sections, use 3 3-4 gallons to a sack.

Turkey Talk

Fred F. McKenzie
Missouri College of Agriculture

TO be transplanted suddenly from the corn belt of the United States to the rocky, barren, burnt hillsides of Western Asia Minor is a transformation almost as shocking as that which overcomes one who steps on a banana peeling. But with the October rains the long five-month drought period terminates, and Smyrna Vilayet (or province) takes on new life. The grass-green that all summer was pent up along the creek bottoms, now spreads over the whole countryside. Of course the vineyards, the fields of tobacco stalks, and the olive and fig groves provide their different shades of green, but apart from them there is a marked lack of vegetation throughout the summer.

Plowing begins as soon as sufficient rain has fallen to make it possible. The steel plow drawn by oxen is used by many. Not infrequently, however, one sees the old-type wooden plow that may or may not have an iron point.

A Smyrna Milk Pedler.

Horse beans, oats, barley, and wheat are the crops sown in the fall. Besides the plow the Turkish farmer depends a lot on one other implement, namely, a type of harrow which consists of a plank in which are driven wooden pegs, two or three inches of each peg being exposed. This plank is dragged over the fields, the small seeds broadcast, and the beans dropped one by one in the shallow drills made by this plank harrow. Then the whole field is again dragged. Later in the winter the

tobacco ground is thoroughly prepared.

Tobacco, fruits, and vegetables are produced in quantities in the country, and cotton, tobacco, vegetable oils, dyestuffs, wool, raw skins, and metals are some of the leading commodities exported.

As for the livestock, the Texas Longhorns would assuredly grade good to choice as compared to what goes on the hooks in Smyrna. Beef is sold in the shops at about 12½ cents a pound, whether it be neck or loin. Custom prescribes that all meat must be consumed within two days after killing. Certainly it must not be marketed after this limit.

Many of the cattle are kept for work purposes, but some farmers keep a few cows for milk. A farmer milks each cow about five months in the year, and sells to a milk collector, who calls with his cans on a donkey. The milk is carried to the city and sold from house to house. The cow barns are poorly lighted, many have stone floors, and all lack good ventilation. A common sight in Odemish, a real old Turkish city some 65 miles southeast of Smyrna, is that of the cows being turned out on the streets about eight o'clock in the morning, to be driven by five or six men and boys to the outlying grazing areas for the day and to be brought back in the late afternoon.

Sheep are numerous, the mutton type predominating. Goats are everywhere. A fair proportion, possibly a third, of the milk supply of the city of Smyrna is from sheep. It was interesting to the writer to learn that it is customary for the shepherds to herd their flocks in their own fields during the day, and at night to shift to the other fellow's farm.

Horses are scare on the farms but are numerous in the cities. Not many mules are to be seen in the Province. Donkeys are thick and always loaded with bundles their own size or larger. Camels travel the roads continuously, usually in caravans of five with a

(*Turn to page* 51)

This Turkish farmer with his slow water buffalo and cumbersome cart has come to the city of Odemish to do some trading.

REVIEWS

This section contains a short review of some of the most practical and important bulletins, and lists all recent publications of the United States Department of Agriculture and the State Experiment Stations relating to Soils, Fertilizers, Economics, Crops, Crop Diseases, and Insects. A file of this department of BETTER CROPS WITH PLANT FOOD would provide a complete index covering all publications from these sources on the particular subjects named.

Fertilizers

The 1928 fertilizer control reports for a number of states were received this month. These reports listed below are more than mere compilations of analyses. They contain explanations of fertilizer terms and laws, describe materials, and discuss trends in the use of fertilizers as shown by the goods on the market. An interesting table in the Vermont report shows that the average guaranteed analysis of mixed fertilizers in that state in 1919 was 2.5-9.5-.5, while in 1928, it was 3.33-8.75-6.17. A table on the Wisconsin report shows the following analysis to be the most popular—2-12-6, 2-12-2, 5-8-7, 3-10-10, 4-8-6, 3-12-12, 0-12-12, 6-12-9, 0-14-14.

"Commercial Fertilizers Agricultural Minerals," Dept. of Agr., Sacramento, Cal., Spec. Pub. 91, *Warren G. Marshall.*

"Commercial Fertilizers, 1928," *Agr. Exp. Sta., Orono, Me., Official Inspections* 129, *Oct.,* 1928, *James M. Bartlett.*

"Report of Fertilizer Analyses, Season 1927-1928, *and Mississippi Fertilizer Law," Dept. of Agr., Jackson, Miss., Dr. W. F. Hand.*

"Inspection of Commercial Fertilizers for 1928," *Agr. Exp. Sta., Durham, N. H., Bul.* 238, *Jan.,* 1929, *T. G. Phillips, T. O. Smith, and F. S. Schlenker.*

"Commercial Fertilizers," Agr. Exp. Sta., Corvallis, Ore., Sta. Cir. 87, *Jan.,* 1929, *R. H. Robinson, C. F. Whitaker, and D. E. Bullis.*

"Commercial Fertilizers," Agr. Exp. Sta., Burlington, Vt., Bul. 287, *Aug.,* 1928, *L. S. Walker and E. F. Boyce.*

"Commercial Fertilizers," Dept. of Agr., Madison, Wis., Bul. 95, *Jan.,* 1929, *W. B. Griem, F. L. Gunderson, B. E. Garey, H. Lousma.*

Soils

The latest bulletin by Dr. G. S. Fraps on his researches dealing with potash in the soil presents correlations among various methods of determining potash availability in the soil. In a number of pot experiments he compares the amount of potash removed by various solvents and also replaceable potash with the potash removed by plants. The replaceable potash correlates very closely with the potash removed by plants. The author concludes that it is a measure of the strength of the soil as regards potash. Interesting and significant correlations were found among various solvents, plant removal, and basic replacement of potash.

The author prefers the active potash determination for securing available potash as it seems to be nearly as significant and is more easily manipulated than the replaceable potash determination.

This bulletin is technical in its nature and will appeal primarily to research workers.

"Liming Western Oregon Soils," Agr. Exp. Sta., Corvallis, Ore., Sta. Bul. 237, *Dec.,* 1928, *R. E. Stephenson and W. L. Powers.*

Crops

Several annual reports have been received this month. We are listing these reports in this section. They deserve careful consideration as a summary of outstanding work of the year at the respective experiment stations.

The Georgia Coastal Plain Experi-

ment Station, in cooperation with the Bureau of Plant Industry, U. S. Department of Agriculture, has issued Bulletin 10 on "Bright Tobacco in Georgia," which contains much useful information for tobacco growers. The investigations made were to determine chiefly the percentages of nitrogen, phosphorus, and potassium to be used in mixed fertilizers to make a well-balanced mixture for tobacco, a good cropping system, varieties best suited to Georgia, and any improvements which might be made in cultivating, harvesting, and curing. The experiments have been underway 4-6 years, and although the information is not considered conclusive, it is given to the farmers as most recent findings.

In the various fertilizer analyses tested, the highest yields of tobacco per acre and the highest total and net (less cost of fertilizer) values of an acre of tobacco were obtained by using 1,000 pounds per acre of a 3-8-8 (N-P-K) fertilizer.

Gray, sandy loams of a mellow nature with a yellow friable subsoil are mentioned as good tobacco soils. Early plantings usually give the best results. The present fertilizer recommendation is 1,000 pounds per acre of a 3-8-5 mixture, and in addition from two to four tons of well-rotted horse manure applied in the drill before planting. The phosphorus should come from superphosphate; the ammonia to be from one-half nitrate of soda or nitrate of soda and ammonium sulphate, and the other half from some organic source or sources. The potash should be a mixture of sulphate of potash and high-grade muriate of potash, the muriate supplying not more than half of the potash.

Lime was of little value on tobacco land except where the dolomitic form was used to prevent sand drown.

The tobacco usually should be planted two feet apart in the drills and the rows should be about four feet apart. Frequent and thorough cultivation, control of insects, removal of suckers when they are not more than three or four inches long, thorough ripening before harvesting, and curing done by experienced persons are other principal recommendations.

"Monthly Bulletin of the Department of Agriculture," Sacramento, Cal., Vol. XVIII, No. 2, Feb., 1929.

"The Effect of Topping and Suckering on Havana Seed Tobacco," Agr. Exp. Sta., New Haven, Conn., Bul. 297, Nov., 1928, *N. T. Nelson.*

"Report of the Tobacco Substation at Windsor for 1928," *Agr. Exp. Sta., New Haven, Conn., Bul. 299, Jan.,* 1929, *P. J. Anderson and T. R. Swanback.*

"Fall Sown Oats for Georgia," State Col. of Agr., Athens, Ga., Vol. XVII, Bul. 355, Nov., 1928, *R. R. Childs.*

"Vegetable Gardening," State Col. of Agr., Athens, Ga., Vol. XVII, Bul. 358, Jan., 1929, *R. L. Keener.*

"Bright Tobacco Culture," State Col. of Agr., Athens, Ga., Vol. XVII, Bul. 359, Jan., 1929, *Edison C. Westbrook.*

"Five-Acre Corn Production Contest, 1928," *State Col. of Agr., Athens, Ga., Vol. XVII, Bul. 361, Feb.,* 1929, *E. D. Alexander.*

"Results of the 1928 *More and Better Cotton Per Acre Contest," State Col. of Agr., Athens, Ga., Vol. XVII, Bul. 362, Mch.,* 1929, *Edison C. Westbrook.*

"Director's Report 1926-1928," *Agr. Exp. Sta., Manhattan, Kans., Dec.,* 1928, *L. E. Call.*

"American Potato Journal," The Potato Association of America, East Lansing, Mich., Vol. VI, No. 3, Mch., 1929.

"Forty-first Annual Report, 1928," *Agr. Exp. Sta., Ithaca, N. Y., A. R. Mann.*

"The Bimonthly Bulletin," Agr. Exp. Sta., Wooster, Ohio, Vol. XIV, No. 2, Whole No. 137, Mch.-Apr., 1929.

"Seed Potato Certification in Pennsylvania," Dept. of Agr., Harrisburg, Pa., Vol. 12, No. 2, Feb., 1929, *Gen. Bul. 471, K. W. Lauer.*

"Forty-first Annual Report of South Carolina Experiment Station, Clemson College, S. C., Dec., 1928, *H. W. Barre.*

"Forty-first Annual Report, 1928," *Agr. Exp. Sta., Knoxville, Tenn., C. A. Mooers.*

"Department of Agriculture Immigration of Virginia," Richmond, Va., Bul. 255, Mch., 1929.

"Cranberry Growing in Washington," Agr. Exp. Sta., Pullman, Wash., Bul. 230, Feb., 1929, *D. J. Crowley.*

"Grain Crops in Western Washington," State College, Puyallup, Wash., No. 11-W, New Series, Jan., 1929, *M. E. McCollum.*

Economics

It is often assumed that margins between prices of farm products at the country shipping points and the terminal markets are too high. Bulletin No. 246, "Country Elevator Margins and Costs in Marketing Kansas Wheat," by R. M. Green of the Kansas Agricultural Experiment Station, and E. B. Ballaw of the U. S. Department of Agriculture, is a study of these margins. It is stated in the bulletin that "60-85 per cent of the elevators reporting attempted to buy wheat on a margin of from 4 to 6 cents." To cover all legitimate costs an average buying margin of 7 to 8 cents per bushel is necessary under present operating conditions in Kansas.

"Systems of Farming for the Hill Sections of Mississippi," Agr. Exp. Sta., A. & M. College, Miss., Bul. 257, Sept., 1928, Louis E. Long and R. S. Kifer.

"Improving Quality by Grading Cannery Products," Dept. of Agr., Harrisburg, Pa., Vol. 12, No. 5, Apr. 1, 1929, Gen. Bul. 474, D. M. James and R. B. Donaldson.

Diseases

"The Combination Cleaning and Treating of Seed Wheat," U. S. D. A., Washington, D. C., Leaflet No. 33, Feb., 1929, F. C. Meier, E. G. Boerner, G. P. Bodnar, C. E Leighty, J. Earl Coke.

"Equipment for Spraying and Dusting Pecan Trees," Agr. Exp. Sta., Gainesville, Fla., Pr. Bul. 413, Mch., 1929, R. E. Nolen.

"Pecan Scab Control," Agr. Exp. Sta., Gainesville, Fla., Pr. Bul. 414, Mch., 1929, R. E. Nolen.

"Potato Experiments for the Control of Rhizoctonia, Scab, and Blackleg, 1922 to 1927," Agr. Exp. Sta., Manhattan, Kans., Tech. Bul. 24, Oct., 1928, R. P. White.

"Spraying Fruit Plants," Agr. Exp. Sta., Manhattan, Kans., Cir. 145, Mch., 1929, W. F. Pickett and W. R. Martin, Jr.

Worth While Fertilizers

(*From page* 26)

purchased. The production of nitrogen by the growth of legumes is in most cases limited by the lack of enough phosphate and potash in the small amount of fertilizers applied when wheat is used as a nurse crop for the clovers.

Of recent years scientists have discovered that potash plays a much more important part, than was formerly believed, in the profitable production of many crops. Thousands of farmers are producing sugar beets with little or no potash. Yet tests have shown that potash will pay for itself many times over with more sugar per pound of beets. It should be used in larger quantities in the production of all root crops than it has been. We know now that certain plant diseases are caused by a lack of potash, which fact should encourage its use, and it is quite remarkable that the price of potash is as low as it is in view of the long freight haul involved, part on sea and part on land.

It would not require a very long time to educate the farmer to use 125 lbs. of a 6-32-12 which contains 62½ lbs. of plant food, and certainly this is not too much to use on an acre. It would benefit the two crops which must feed from one application, the wheat crop and the grass crop.

We all know that clover or grass crops are heavy feeders, despite the fact that farmers think the land is resting while growing grass or hay.

Perhaps a 6-32-12 is not perfectly balanced, but it is probable that some day farmers will fertilize the soil not according to the type of soil, but according to the plant food requirements of the crop being grown. If they ever do, manufacturers will sell more fertilizers and farmers will grow better and larger crops per acre. And because the farmer will be enabled to

buy more plant food for the dollar, the law of diminishing returns will not apply to fertilizers as quickly as it does now.

In Germany, many farmers get an average of 50 to 60 bushels of wheat per acre. It is not all due to cheaper labor, and certainly not due to better soil, for we have better soil in the United States than Germany has. But German farmers use large amounts of potash and phosphate, as well as nitrogen on every crop grown.

Let us raise the analysis of the fertilizer sold for we can then lower the price and encourage more general use of it.

Chlorosis

(*From page* 20)

tic mottled appearance. Eventually the foliage may become completely yellow. This stage is usually reached about the flowering or fruit setting stage on tomatoes and soybeans. On spinach it may occur after the unfolding of the first set of leaves. Following this complete yellowing, necrosis sets in appearing first as brown points in the yellow areas farthest from the veins and expanding until there is a complete breakdown of the tissue. This condition is accompanied with very little or no growth, early ripening of fruits of inferior quality, and a generally low yield.

The Treatment

Investigators have found that various treatments will prevent the appearance of chlorotic plants. Chlorosis seems to be due to a soil condition which is not the same for all soil types and locations. Gilbert and others working at Rhode Island Station have noted chlorotic conditions on oats, spinach, lettuce, corn, beets, and beans grown on neutral soils. Iron and magesium treatments did not remove the malady, but small amounts of manganese salts cured the chlorotic condition. This result was correlated with their finds of a lower manganese content in chlorotic plants than in normal plants.

Miller at the Indiana Station has obtained similar results for tomatoes. Schreiner and Dawson working with the highly calcareous soils of the glades in Date county, Florida, under greenhouse conditions found that tomatoes developed a characteristic chlorosis but that it rapidly disappeared with subsequent applications of manganese.

For several years soybeans have exhibited a chlorotic appearance on certain of the fertilizer plots at the Delaware Experimental Station. This condition seemed to be more pronounced on the limed fertilized plots than on the unlimed fertilized plots. Samples of the soil (Sassafras Silt Loam) upon which chlorotic beans had been grown were moved to the greenhouse for study. In making this study, Runk tried applications of commercial fertilizers at a ton rate of 5-8-5, chemically pure salts in the same ratio, and single elements from commercial and chemically pure sources. He found no difference between plants that were treated with chemically pure salts and those treated with commercial fertilizer salts. Untreated soils produced slender plants with slightly chlorotic leaves. Nitrogen and phosphorus produced greater growth and larger leaves, but chlorosis was more prevalent. Plants receiving potassium were larger than those untreated and did not develop chlorosis.

A complete fertilizer applied at time of planting developed normal growth, and a complete fertilizer applied after chlorosis developed prevented further chlorosis. Treatments with soluble iron or manganese did not correct the chlorotic conditions.

It seems that all the conditions that produce chlorosis are not known and that further research is necessary in order that proper recommendations may be made.

Schreiner, O. and Dawson, P. R.—Manganese Deficiency in Soils and Fertilizers, Ind. and Eng. Chem. V. 19, p. 400. 1927.

Miller, L. P.—Manganese Deficiency in Sand Cultures, Fertilizer Green Book, V, IX, p. 11-13, April, 1928.

Gilbert, B. E. et al.—The Relation of Manganese and Iron to a Lime Induced Chlorosis, Soil Sc. V. 22, p. 437-446, 1926.

Runk, C. R.—Effect of Potash on Chlorosis of Soybeans, Jr. Am. Soc. Agr. V. 20, p. 876, 1928.

Potash Turns the Trick

(*From page 6*)

plots on soil that would not be entirely uniform. Then came the 12 rows fertilized with the 3-8-0 mixture; next the 3-8-6 strip; then a 12-row check plot or control. The 3-8-12 was applied on the next 12 rows, and finally came the dozen rows of 3-8-16. The remainder of the field was unfertilized.

Although field visits were made at various times during the growing season, there was no noticeable difference in growth until August. At that time all plots showed a slightly better vine growth than did the control. In September the vine development on the 3-8-12 and 3-8-16 plots had increased to form a nice contrast when compared to the unfertilized control area. The 3-8-0 and 3-8-6 mixtures showed some advantage, but less noticeably than the higher potash compounds. A lighter green color existed where the vines showed the greatest growth.

Harvest, on October 2, told the real story. Two rows of each plot were dug and weighed. Digging was accomplished by hand, because excessive rainfall made the use of a digger impracticable. The potatoes were sorted into "marketable" and "culls." On the day that digging took place potatoes were selling at local markets at 30c per bushel. This price was taken as the basis for computing returns above fertilizer costs.

In short, potash turned the trick on this Miami Fine Sandy Loam. Neighbors who had been interested in the demonstration all summer turned out to witness the digging and weighing,

FERTILIZER TESTS ON POTATOES, BERLIN, GREEN LAKE COUNTY, WIS., 1928
PER ACRE

Plot No.	Area in Plot	Fertilizer Used	Rate of Application	Fertilizer Cost	Per Acre Yield Marketable Potatoes	Per Acre Yield Culls	Value of Crop Increase @ 30¢ per Bushel	Returns per Acre above Fertilizer Cost
Check	1/3 A.	None	None	....	74 bus.	15.5 bus.	....	...
No. 1	1/3 A.	3-8-0	600 lbs.	$ 9.75	111 bus.	12.5 bus.	$11.10	$ 1.35
No. 2	1/3 A.	3-8-6	600 lbs.	11.70	146 bus.	6.5 bus.	21.60	9.90
No. 3	1/3 A.	3-8-12	600 lbs.	13.65	163 bus.	10.0 bus.	26.70	13.05
No. 4	1/3 A.	3-8-16	600 lbs.	15.60	193 bus.	5.0 bus.	35.70	20.10

Farm—Henry Traugott, Berlin, Wisconsin.
Cooperating—Messrs. Henry Traugott, Ed. Lichtenberg, County Agent James Lacey, and Harold G. Frost of Portage, Wis.
Soil Type—Miami Fine Sandy Loam.
Variety—Selected and treated Rural New Yorker potato seed.
Crop—Planted May 31. Dug October 2, 1928.

and to view the results. After the whole matter had been decided among themselves, they were satisfied that potash was what they needed most on that good potato soil in northern Green Lake county.

Profit in Late Cabbage

(*From page* 30)

Seed planting takes place from the 5th to 10th day of May, and the seedlings are ready to transplant to the field from the 20th of June to the 1st of July. Weekly cultivation of 10-day intervals until September 10 keeps the crop growing with the abundance of fertilizer applied correctly.

The only other point that needs to be emphasized in this work is that of keeping down the insects, particularly the imported cabbage worm. Mr. McKnight starts early in the life of the plant in order to catch this insect when it is small. Very soon after the plants are set in the field, the first application of poison is given, sometimes even in the seed bed if the small yellowish butterflies are abundant. If one application is washed off too quickly, he gives a second one in a week or ten days. Enough poison is found on the young leaves to kill the worms as soon as they eat any of the foliage.

It is a pleasure to go through his field, find the rows straight, the plants evenly spaced in the row, each plant of about the same size and same stage of development and hustling to maturity as fast as possible. It makes one feel good to get in a field of this nature. Mr. McKnight is justified in the great pride he takes in raising the crop.

More and Better Melons

(*From page* 25)

cent of the superphosphate and from 4 to 6 per cent of the potash can be tried by the grower.

Organic matter and good soil drainage are co-workers with chemical fertilizers in the matter of producing bumper yields of fine flavored melons. Good drainage is essential, but the use of organic matter needs careful management. For example it is very easy to burn the hills up with the use of organic materials applied in the hill. The turning under of green manuring crops such as soybeans, cow-peas, and sweet clover is the best way of adding organic matter to the melon field.

The addition of manure to the hill requires caution. Only well-rotted manure is used in any case. Where it is used, it is best to mix it well with the soil in each hill. The chief source of trouble with the use of manure in the hill lies in the often resultant drying-out of the hill and the premature death or burning-up of the vines.

The melon grower who can hit upon the easiest and best and cheapest way of producing a fine flavored melon can corner the market. At the present time his best bet is to use generously and frequently the copper-lime and the gypsum arsenate dusts for disease and insect control and to depend largely upon chemical fertilizers in connection with green manure crops as a source of plant food.

Turkey Talk

(*From page* 44)

donkey in the lead. The camels here are not ridden. Hogs exist only in the wild state. Males of all kinds except a few oxen are entire.

Rarely do farmers live as isolated families, but rather in groups, or villages. In the rich agricultural section near Odemish, about 15,000 people live in the city proper, and 65,000 live in the many villages around the town.

In a seaport like Smyrna one sees much that is Western, but a visit to the interior reveals much like we read about. The fez is replaced by the hat, but beyond this I have seen little in the interior that is Western. As a guest of a well-to-do family, I slept on mats on the floor; washed in the morning squatting while my host poured water over my hands. Everything was the best they had and Turkish hospitality is unsurpassed. I was not permitted to see the women of the home, except as I glimpsed them crossing the courtyard.

Turkish schools are rapidly increasing in number and quality. The difficult Arabic script has within the past few months been replaced by the Latin characters. The war-ravaged sections are being gradually built up along well-defined lines and in a creditable manner. Some of the roads are receiving sorely needed repairs. The Turk is making rapid strides of progress, and the "Terrible Turk," the "Unspeakable Turk," really "isn't." In fact he is quite human and is forging ahead.

Beardless Barleys

(*From page* 22)

Many of the beardless or hooded varieties, as they properly should be called, shatter very readily. The writer is familiar with one variety at least, however, that does not shatter. A strain of hooded barley developed at the Union Experiment Station at Union, Oregon, by hybridization methods, is of a non-shattering type. This variety has never been named or distributed to growers.

The smooth condition of the beard is known to plant breeders as a recessive character. Therefore, plants in their second year after hybridization that show this smooth-bearded character breed true for this particular character. In other words, if a smooth-bearded variety is crossed with a common growing variety of a community which has barbs on the beards and is otherwise high yielding and desirable, the smooth-bearded types appear in the second generation after the cross, and all of these smooth-bearded types breed true for that particular character.

Because of this comparatively simple inheritance of the smooth-bearded character, many plant breeders are working on the development of these new types of barley. The introduction of a half dozen new smooth-bearded varieties in a short period of time indicates that many breeders are thinking along these lines. Without a doubt much more will be heard in regard to the development of smooth-bearded varieties in all sections of the country.

Under the arid conditions of the West, it appears that beardless or hooded barleys, as they should be called, have a place. The Colorado Station has developed a beardless barley known as Colsess which has given fairly good results in some sections. A standard beardless barley in many places in the West is known as Success.

Winners of Gold

(*From page 29*)

River, with his yield of 127.1 bushels came within .35 bushels of tying for first state honors with O. L. Bryant, Allen county, whose yield of 127.45 bushels per acre was the highest in Hoosierdom.

"I am certain that I would have won first place," said Mr. Williams, "but the wind blew a large amount of my corn down, and 16 days before the tests were made, I turned 150 head of hogs averaging 85 pounds into the field to clean up the waste corn." When asked what he credited his high yield to, Mr. Williams replied, "narrowing down the rows to 36 inches, drilling closer in the rows, and the application of plenty of commercial fertilizer were the main factors in my high yield.

"I know fertilizer played an important part," he declared, "for the drill clogged up and two rounds of the field were made without drilling any fertilizer. After the corn came up you could stand back and tell the exact places missed. The corn wasn't as sound, it was later maturing and it wasn't as big where the fertilizer was left off, and my experience has taught me that early maturity is a very important factor to consider in growing corn on river bottom land."

Walter Jones, age 17, with a yield of 120.68 bushels per acre, and his father, Elvis Jones, with a yield of 117.92 bu., won fourth and fifth places, respectively, in the state contest, thus giving Martin county three of the first five high score winners. They both give a great deal of the credit for their high yields to the application of commercial fertilizer.

The five other Martin county farmers in the list of gold medal winners were Harry Tedrow, William G. Nikam, Wilson Chenoweth, John T. Larkin, and Cosmos C. VanHoy.

Warren Nikam and Clarence Jones were among the silver medal winners for having yields of between 85 and 100 bushels per acre, and Martin Thimling's name appeared in the list of bronze medal winners for producing between 75 and 85 bushels per acre.

Thus all of the Martin county contestants finished 100 per cent medal winners, while considerably less than half the total number of entrants in the state-wide contest succeeded in qualifying for even a bronze trophy.

Limestone in Bulk

(*From page 28*)

he can spread his job of hauling over the entire year—for we know limestone is good any season and at any time.

All of us in Linn county are interested in better crops. And just as selfishly, perhaps as you are, we like those crops to be the best possible. So our banker friends got together, also some of the merchants, farm club exchanges, farmer cooperatives, and the Burlington railroad.

At every town where lime was wanted, we decided to maintain a lime bin. Now that isn't much more than a platform for unloading the cars. It doesn't cost much for materials, and the railroad cooperated by leasing the space on its right-of-way for practically nothing. In addition to this the banks put up $100 each, without interest, and this was used as a revolving fund for limestone purchase, unloading cars, and other incidental expenses, all of which were

added to the cost of the lime to the purchaser. For instance the average cost of unloading a car of limestone has been 15 cents a ton. Shrinkage and loss has amounted to about 5 cents a ton, weighing 5 cents. So in addition to cost of limestone and freight, there has been added an average of 25 cents a ton to the cost. In this way the bankers have not donated anything except the interest on their $100, although they were willing to give this amount had it been needed.

The first spring 35 carloads of lime were handled in Linn county, which is more than was handled during the entire year of 1925. The success with lime has created greater interest in its use. This has resulted in many full cars being ordered and hauled to the farms on arrival in 1927 and '28. Last year the business was sufficient to allow us to pay interest to the cooperating bankers.

This plan has spread to other counties in Missouri and Illinois. On one railroad crossing northern Missouri, there is a lime bin at more than half of the stations. Lime is now stocked at nine of the ten railroad stations in Linn county.

The cooperating agencies are: The farm clubs at Browning and Brookfield, the farmers' cooperative at Laclede and Marceline, a lumber company at Purdin and Meadville, the general store at Forker and St. Catherine, and the Farm Bureau at Linneus. These folks are handling the cars and weighing what the purchasers take out for from $2.50 to $3 a car. So now we are laying down the lime at the bins purchased from quarries at $2.00 a ton.

Many of our farmers who gave up the idea as hopeless before are using lime. They were not in position to handle an entire carload.

I might add that the Brookfield Chamber of Commerce has provided storage space and leased the right-of-way from the Burlington Railroad and paid all expenses of constructing a driveway to the bin. All around it has been cooperation in a worth while way, showing what can be done when all agencies cooperate to the advantage of all, since surely our increased farm prosperity will be reflected in better business for all the agencies that have helped. We earnestly commend the plan to every sour soil community that wants to get ahead via the legume route to prosperity.

Rye

(*From page 27*)

states than in the states farther west, a general decline in the United States average production per acre is noted.

For the five-year period before the World War—1909 to 1913—the average yield per acre for the United States was 16.1 bushels, while for the period 1921-1925 it was only 13.9 bushels. A marked increase in the acreage of this crop occurred during the war when it exceeded six million acres for several years. Since then, however, it has declined to a figure slightly above that of the years just before the war.

Much of the American rye consumed in the United States is used as a feed crop. Normally from about one-fourth to one-half of the production is exported. European countries, particularly Germany, as well as Canada, are constant buyers of American rye. As a rule, the United States rye exports are about equally divided between Canada and the various European nations.

In some states, notably Wisconsin and Michigan, rye is commonly grown on the lighter soils and its straw often has considerable value. In the states farther west where the largest acreages

are now found, it is frequently grown as a substitute for wheat. It is more hardy than winter wheat; hence, it is a suitable winter grain in sections which lie outside of the main winter wheat belt. This accounts in a large part for the present location of much of United States acreage of this crop.

It will be noted from the map that the principal rye belt of America lies for the most part a little to the north of the most important wheat regions. A small portion of the acreage also lies farther south than the wheat belt. In the Northern states rye is grown almost wholly for grain, while in the Southern states it is frequently used for forage and green manure in addition to its use for grain.

While rye bread is well enough known to be familiar to almost everyone, its use in general seems to be declining. When allowance is made for our exports, the entire United States consumption of rye becomes only about three-tenths of a bushel per capita. Our total production is less than a half bushel per capita at present, whereas in 1850 it exceeded a bushel.

A Viable Agriculture

(*From page* 16)

an honest report of an actual accomplishment that can be duplicated many times in North Carolina. The sum of these accomplishments means that farmers are influenced by these earnest college workers to fertilize as the crop and soil demands.

In his study of the county agents' reports, Mr. Blair finds other things equally as interesting. Farms look neater, he says, where crop rotations are followed. Some of the men who have been conducting definite rotations for a number of years have built new homes and barns, and a general air of prosperity pervades the environment. North Carolina farmers, like those of other states, have suffered from low prices of products in recent years, but all over the State there are men who make money each season. These men do not fool themselves. They apply sound business principles to their enterprises. They are balancing their farming, building their soil, using the right kind of fertilizers, and they are making the investment in all of these pay them a return, either in money or in a richer soil for future profits. Sometimes they are checked here and there by unforeseen incidents, but progress generally is steady and sure.

Glancing Ahead

(*From page* 19)

that official forecasts tend, by the very weight of their authority, to come true even when supply-and-demand conditions work in the opposite direction. It was apparently some such feeling that impelled Congress to interdict cotton price forecasts last year. The complaint was not that the cotton price forecasts previously issued by the Department had been wrong, but rather that they had been right. A price forecast issued in September,

1927, evoked strenuous protest, though the subsequent course of prices fulfilled it almost to the letter. It was charged that the Department, instead of merely forecasting prices, was practically fixing prices.

The accusation of course was unfounded. Statistical research has demonstrated that nothing resists supply and demand, except for brief periods. Many governments have recently rediscovered this truth in vain attempts to ignore supply conditions in naming prices. In comparison with the efforts exerted, for example, by the British Government in attempting to carry out the Stevenson rubber restriction scheme, the effect of price analysis on prices can only be trifling. As a matter of fact, the most authoritative market forecast can scarcely do more than keep prices from fluctuating too far above or below the natural supply-and-demand level. This, indeed, is the proper function of official price analysis. The object is to increase the quantity of informed opinion bearing upon prices, so that the influence of uninformed opinion and guesswork may be reduced.

After reckoning up the cotton outlook in 1926, the Department warned farmers against expanding their acreage. Yields above the average on an acreage equal to that of the previous season, it said, could easily result in prices unprofitable to many producers. It added a warning that an increase in acreage would aggravate matters. This warning went unheeded. The farmers added a million acres to the 1925 cotton area, with the result that the 1926 crop, though much larger than that of the previous year, brought the farmers $450,000,000 less. In 1927 the outlook report advised the cotton growers to reduce their acreage 30 per cent. This recommendation was based, not on a mere hunch, but on a detailed analysis of supply-and-deman prospects, as indicated by carry-over figures, world consumption, and other data. Whether the farmers paid any attention to the Department's advice, or were influenced merely by the memory of low prices in 1926, is not known; but they did reduce their acreage, not 30 per cent as the Department recommended, but 14.6 per cent. It is by no means a coincidence that cotton prices advanced.

Long experience has established some important facts about cotton prospects. Farmers tend to be guided, both as to the area they will plant and as to the amount of fertilizer they will use, by the prices received for their last crop. This makes it possible as early as January to forecast the area likely to be planted, and also the quantity of fertilizer likely to be used. It is also known what prices are likely to prevail for different sized crops; in other words, analysis of past supply-and-demand relationships has yielded a fairly accurate schedule of the *extent* to which changes in production will normally send prices up or down. With such information at his disposal, the farmer can decide intelligently whether he should increase or decrease his planting. The fact that collectively he has never yet done so is beside the point. Knowing the cotton acreage, and knowing also the price that usually prevails for an average crop grown on an equal acreage, the up-to-date farmer has a fair guide as to whether he should increase or decrease his own plantings.

A comparison of the outlook report issued by the Department a year ago (February, 1928) with the subsequent course of farm-commodity prices shows that nearly all the forecasts made were correct. Thus the report predicted a beef-cattle market averaging higher than the very satisfactory average of 1927. In September, 1928, beef-cattle prices were the highest since 1919, and in unit purchasing power beef animals were at the highest point on record. For the hog market, the outlook report for 1928 predicted "some strengthening." By mid-September the hog price level was 50 per cent above that prevailing

earlier in the year. The forecast for corn did not come so close to the mark. Corn prices, the February statement said, were "more likely to approach the average for the 1926 crop than those which have prevailed to date for the 1927 crop." Large production in the United States tended to bear out this estimate of the probabilities, but a short corn crop in Argentine as well as a short corn crop in Europe introduced an unanticipated factor into the situation, with the result that a United States corn crop larger than that of 1927 was worth on December 1 a slightly higher average price at the farm.

Oats, said the February, 1928, outlook report, are likely to meet a less favorable market in the next crop year. In November, 1928, the average farm price of oats was 29 cents a bushel, compared with 45 cents in November, 1927. For the dairy industry, the Department predicted only moderate expansion in production, with consumption likely to increase faster than output. Butter prices, the best index of dairy product values, averaged higher in 1928 than in 1927. An optimistic forecast for wool was borne out. Wool prices advanced in the face of apparently increased supplies, and were well maintained until the last of the crop has been sold. Flax acreage could be profitably expanded, the outlook report said. Flaxseed prices were considerably higher in October, 1928, than in the corresponding month of the previous year. Barley, said the report, was unlikely to bring prices as high in 1928 as those it brought in 1927. On December 1, 1928, the average price of barley at the farm was 55 cents a bushel, compared with 67 cents in December, 1927. Fruit growers were told to look out for congested markets and severe competition, and such conditions prevailed.

Winter-wheat growers were told as early as August 23, 1927, that with normal yields in the important producing countries, the world market situation during the next year might become less favorable for marketing our export surplus. Spring-wheat growers were advised in January, 1928, that market prospects indicated "they should hesitate to increase their acreage." This was sound advice, for wheat prices in the heavy marketing months of 1928 averaged about 23 per cent lower than in the corresponding months of 1927. It detracts nothing from the significance of such forecasts that as yet they do not influence the producers greatly. Their potential value is indubitable.

Illustrations could be multiplied, but those given should show that the price analysis work of the Department of Agriculture is not guesswork. As a matter of fact, the expectation of accuracy is from 80 to 90 per cent. Forecasts of long-time trends, like those given in the outlook reports, must allow a margin for the unpredictable influence of the weather on production. Yet the outlook reports, in spite of this difficulty, have been about 90 per cent correct in the last three years. This average may be compared with that of the weather forecasts in the Washington district for the period 1915 to 1919, which ran about 85 per cent. Citing these figures in a recent address, Dr. Stine urged that the utility to the farmer of reliable price forecasts is certainly not less than that of reliable weather forecasts. Though price forecasting is still experimental, it is already of practical value.

Useful results are expected from recent progress made in the study of demand. Heretofore the volume and the accuracy of the available statistical material have been much greater on the supply side than on the demand side, for two principal reasons. First, supply fluctuates more than demand. Studies have shown that the analysis of supply alone will explain 90 per cent of the annual average price of hogs, for example, over a long period of years. Variations in the supply of cotton are even more influential in de-

termining prices. In the experimental stages of price analysis, it is relatively more important to have information about supply than about demand. In the second place, the measurement of demand is considerably more difficult, depending as it does on such factors as the influence of the general price level on purchasing power, the relation between business prosperity and food consumption, and the substitution of one commodity for another in various uses under different price conditions.

It is important, nevertheless, that the study of demand should not be shirked. Under certain conditions, such as those prevailing during the World War, the demand for farm products may vary more than the supply. Even in peace time an exceptional demand situation may arise. Adequate price forecasting can not be confidently based on the assumption that the usual influence exerted respectively by supply and by demand on prices will always prevail, because it most certainly will not. But progress in estimating the significance of changes in demand will unquestionably take place. Meantime, it is well to remember that the thorough analysis of supply alone can throw much light on market prospects, since the demand for the principal crops is fairly constant as a rule.

Price changes depend, in the Department's opinion, on tangible and measurable elements in the supply-and-demand equation, and not on caprice, speculation, or monopoly. This opinion has statistical backing. Price studies covering important farm products over many years have shown that all other factors combined are negligible in their influence on prices, compared with supply and demand. Occasionally speculation, or some other special influence, causes prices to move away from the supply-and-demand line; but this condition never lasts for very long. That is the testimony, not of theory, but of facts, particulars concerning which are available in the Department to any interested person. Ups and downs in prices as a result of factors not representing real supply-and-demand changes soon cancel out, leaving the underlying economic law to dominate the situation. It follows, therefore, that increasing facility in the measurement of supply and demand means increasing power to forecast price changes.

No fear need be entertained that the use of price forecasts by farmers will increase the speculative features of their business. It will have rather the contrary effect. Anticipations of the future are unavoidable in any business, and particularly in agriculture. Much time must pass after the farmer plants his crops or breeds his livestock before the result of the undertaking will be ready for the market. He can not avoid a speculative risk here, and he had best take it with his eyes open. The risk is less if he obtains the closest possible estimate of what conditions will be like when he comes to the market place. Traders in farm products understand this well, and strive constantly to cut down the speculative element in their business by seeking all the information that may bear upon it. Farmers still allow the speculative side of their crop planning to overbalance the scientific side, because they are not persuaded anything much can be done about the matter. Herein they are decidedly wrong.

As agricultural price forecasting becomes more reliable, it will lessen speculation in the agricultural commodity markets, as well as in the planning of farm work. Reliable information as to the supply and demand prospects, joined to the knowledge that the supply-and-demand relationship is the final determinant of prices, tends obviously to reduce the influence of speculative opinion on the course of prices. The publication of methods of analysis and forecasting, says Dr. Stine, gives many more people the opportunity to determine the real value

of a product. Thus the higgling of the market is restricted within a narrower range, and the price at any time during the marketing season is more nearly equal to the true supply-and-demand value.

Much has already been accomplished toward preventing unnecessary price fluctuations. Wide distribution of authentic market and production news reduces the influence of rumor, and diminishes the excuse for wide differences of opinion as to crop values. Further progress in the same direction, with supply-and-demand prospects indicated in terms of price probabilities, will narrow the scope of speculation still more.

Maryland

(*From page* 12)

experiments with soils and animal feeding, and variety tests of the staple farm and fruit crops.

Some of the early tests, however, have been continuous and have formed the basis for valuable information that has been utilized in recent years. The wheat variety tests, for example, the oldest of their kind in the country, have supplied the necessary information for determining the effect of environmental factors on wheat yields. From these plots, too, came the original seed for approximately 70 per cent of the wheat now grown in the State.

The first soybeans ever grown in Maryland covered a three-acre plot on the experimental farm in 1888 and from there have spread over approximately 50,000 acres of land in the State, constituting one of the important hay and forage crops of Maryland.

New lines of research work, notably dairying and poultry, have been inaugurated from time to time until there are now about 185 projects under way. There are two branch experiment stations, one at Ridgely, Caroline county, for varied crop and soil fertility investigations, and the other at Upper Marlboro, where important tobacco investigations are under way in cooperation with the United States Department of Agriculture. In addition, many fruitful trials and tests of various kinds, involving specific problems, are conducted throughout the State in cooperation with individual farmers.

It would be next to impossible to give any comprehensive idea of the research work now under way at the Maryland Agricultural Experiment Station without going into interminable details. It would hardly seem fair to describe some lines of work to the exclusion of others. About all that can be said is that the major lines of work now under way come under such general heads as agricultural economics, agronomy, animal husbandry, plant propagation, canning, dairy husbandry, entomology, home economics, plant pathology, plant physiology, pomology, poultry husbandry, seeds, soils, tobacco, and vegetable gardening.

The recent progress of experimental work in Maryland is due to the directing genius of Dr. Patterson more than to any lavish appropriations for expansion. Headquarters of the Experiment Station remain within the red brick walls of the old Rossbourg Inn, a noted rendezvous for the traveling public in stage coach days. Two frame buildings, built many years ago at a cost of $750 each, one to be used as a dairy building and the other for a horticultural building, are still in use.

The Maryland Agricultural Experiment Station under Dr. Patterson has truly been a service institution. The

statement that results of its work return to the State more in a single year than maintenance of the station has cost during the entire period of its existence is probably short of the actual facts.

Industry Presses Onward

(*From page* 13)

agriculture and to the industries that more specifically serve the farmer. Some complain that the march of industry is building and crowding our cities and depleting our countryside; that it is one of the influences that is changing the farm home from a way of living to a demonstration in efficiency. The loud cry is heard in the land that the growing industries of our great cities are competing with the farmer for the nation's prosperity —in the exchanges for the finance and in the day's work for the best labor.

"Industry," says Sheldon, "is absorbing some of our best brains; it is marshalling in its ranks both scientists and artists, teachers and theorists, educationalists and engineers. It is offering wider responsibilities and requiring more expert practitioners."

The farmer is behind in the march. Many of the industries that serve him are behind with him. But in the face of these complexities and added responsibilities that in recent years have been so large a share of the day's work of all interests allied with agriculture, the industries that serve the farmer have taken their definite place in the march of industry as a whole. Far-reaching internal and external adjustments in production and distribution have been accomplished.

Industry Aids Agriculture

Not the least important development, largely of recent years, has been the organization within these industries of technically trained forces to aid the farmer in the utilization of the products of industry. Typical of this development are the scientific and agricultural staffs maintained by the companies that supply some millions of tons of fertilizer to the farmer. Where even twenty years ago such forces were quite limited in number, the mixed fertilizer and fertilizer materials industries now employ agriculturally trained men totaling in the hundreds. Other industries serving the farmer are doing similar work. For instance, agriculturally trained staffs are maintained by machinery and equipment, seed, feed, lime, insecticide and fungicide companies, railroads, banks, and others. The organization of such forces is a growing movement. It is assuming proportions that no longer can be ignored.

The question arises, why is this maintenance of trained agricultural forces on the part of industries of any importance? Primarily because it is a part of the much larger movement, the march of industry as a whole; intimately associated with the growing idea that industry is fundamental to and not incidental to the life and well-being of the nation.

In addition, four other reasons might be cited. First, because the organization of such forces on the part of industry is vitally related to the use of our greatest national resource, the land. Second, because in advising the farmer regarding the best use of the products of industry, the agricultural colleges and industry have much in common. Some degree of unity in broad objectives is essential if their respective obligations to the farmer are to be properly observed, confusion

avoided, and the greatest benefit accrue to industry and agriculture. Third, because the organization of agricultural staffs within industry affects the utilization of the products and services of commerce and industry and therefore the success and prosperity of the farmer. Fourth, because the introduction of scientific reasearch into industrial production calls at least for more exact, if not for more technical, knowledge in the utilization of these products and services.

Principles for Harmony

It is particularly the principles underlying the work and place of the technical agriculturists in industries that serve the farmer that it is my desire to discuss briefly. Details of such work may and do vary. No one man may be qualified with any degree of authority to discuss the variety of methods and details that comprise the sum total of such work. It, therefore, will not be attempted.

If, however, the definite goal of such work within industry is to be defined; if the relationship of agricultural workers in industry to the workers in scientific agriculture is to be harmonized, then underlying the work of the industrial agriculturists must be defined some principles which will serve as the basis of broad policies for the work as a whole.

Neither must it be forgotten that the agricultural group in industry, isolated from the business man, can accomplish nothing. His leadership, his expert knowledge, his long experience in the ways of commerce are making significant contributions to the march of industry. In the industries that serve agriculture, as in others, technically trained workers can only fulfill their purpose so long as they become business-minded with a tolerant and sympathetic outlook on industrial leadership and a willingness to work in harmony with it.

Such principles must, therefore, provide a working basis for two significant relationships of agriculturists in industry—on the one hand with the men of business—on the other with the men of science in agriculture. It is only when these relationships are harmonized, when a common meeting ground is defined clearly, that we shall possess sufficient knowledge and experience to formulate a definite plan, to see the goal, and to make that contribution to the march of industry that the changing concept of industry in national life demands.

Editor's note: In subsequent articles in this magazine, Mr. Callister will discuss some of the principles involved in this movement on the part of industry and endeavor to determine something of its direction and dimensions.

Mothers

(*From page* 4)

on too much trimming and embroidery in the life of the older child. The frills on the old-time infant's outfit meant little to his welfare, but tickled the mother's vanity. It's the same way now—the fancy furbelows we insist upon for foolish adolescents do them little good, but help us to "keep step with the neighbors" and "in tune with the times."

In this direction the mother is led—nay pushed, and even pulled and yanked—by a motley crew of supersales agencies, often in disguise, but forever insistent. They belabor the besieged budget from every angle and

array the heart motives on their side regardless of financial obstacles.

Children are raised in an era of magnetic expansion, of commercialized education, of industrial supremacy—and the fortitude and resistance of modern motherhood must be like steel and concrete compared with the logs and thatch of earlier eras. And yet how hard it is for mothers to be hardboiled, especially if daddy is a softboiled egg.

Somewhere in my browsings I found what is purported to be a mother's confession of faith:

"I owe a debt to my children. Having brought them into the world, their father and I owe it to them to furnish a happy, free life of physical health, cheerful industry, intellectual growth, moral dignity, and sanity. To pay my part of the debt, I have at my command a certain amount of money, physical strength, intellectual vigor, nervous energy, and spiritual force. If I am to be honorable, I must, as every honest debtor does, use my resources first of all to keep up my payments."

I like part of her creed, but I would adopt it with reservations were I in her shoes. Self-abnegating motherhood is not always so well appreciated as the kind which sometimes asserts its own rights. The germ of selfishness which is found in every youngster may flourish too fast where mothers efface themselves completely and give up everything to the nursery. Grown-ups are entitled to a part of life's joys and freedom, and many a mother entangles herself in those proverbial apron strings.

This need not mean "farming out" the children to a governess or a nurse maid from breakfast time to bed. But the companionship of other capable adults on specified occasions may have some advantages, to wit:

When I was in knee-breeches, our nature study consisted of robbing birds' nests and frying frogs' legs. The only kind of scouts we knew about were those who "made the redskin bite the dust" between the breathless, dog-eared pages of Dead-eye Dick. But my nephews are out once a week, rain or shine, in flannel shirts and leggings tramping after a sturdy friend of mine with gray hair and jolly wrinkles around his eyes. He is a disciple of Baden-Powell and Teddy Roosevelt, and he can splice rope, skin rabbits, make whistles, and talk "Injun." He knows more about boy language than most mothers, and he heads off a streak of meanness by walking the legs off his troopers.

Girls learn to become "hard as nails and dipped in sunshine" through the kind offices of a "foster mother" of the camp fire and the trail. And finally, both genders mingle without self-conscious diffidence in the wholesome tasks of head, heart, health, and hands.

Mothers whose youngsters are in the company of such substitutes need not fear to take a moment's recess. They may for a moment throw off their professional vigilance. The parental relief squad often is indeed making citizens of a broader kind than "mothers used to make" when outside activities were regarded with suspicion.

Now here I pick up an author who says that "every single person has a trace of youth about him, but no parent is young." I am aware since our children grew taller that we parents belong to the older generation, but I don't want their mother to get wise to it. I don't want her to feel

less spiritually buoyant than is humanely possible after ironing my shirts and darning the school socks all day. Strange, isn't it, that she and the other girls of our own set look just about as young to me as they ever did? That's why I cannot get over buying her size 36, regardless of the horrors of a return trip with the stuff.

It all depends on the self-culture of mothers. Some of them have ample time for enjoying life anew in the lives of their children, and relish the opportunity. Others go into mourning after the first diaper is made and never find the secret of youth again.

WE still have too many old mothers at middle age, but, thank heaven, not so many as before. Although I am not an extremist, I would tolerate a glimpse of a mother's bare knee under a short skirt rather than see her wear the dismal drapes that used to make grandmothers out of young matrons. The rejection of yards of black alpaca and smudgy old bonnets, together with the elimination of dust catching curlicues in the parlor, have followed the bitter doses of Lila Spinkham into the vanished age of feminine despair.

In the good old days both parents and children were trying to see who could get old quickest, but now they are striving to see who can stay young longest.

Mothers have to face two conditions that challenge no other great professions of the world. A teacher may find the classroom irksome and seek employment in an office; the stenographer may prefer to dictate rather than to receive dictation, and turn to the school for occupation. But a mother, once started on her responsible career, is morally and sentimentally obliged to carry on no matter how hard the task becomes.

Then, again, compare a mother's job to that of two vocations to which she is often related by romantic poets. The gardener may be likened to a mother as he weeds the tender plants, waters them refreshingly, and watches them bloom with radiance. The sea captain may be taken as a metaphor of motherhood as he weighs anchor and steers his craft through perilous reefs to some fair haven.

Yet where is there a gardener who can hope to learn his profession in one season of experiment, and what would happen to his flowers by such a method, or to his ambition, were he doomed to enjoy but one pleasant fleeting term of employment?

Where is there a shipmaster who would enjoy assuming command on his maiden voyage over the bounding deep, or who would spend much effort learning the ropes if he should be told that his first voyage must be his only one.

But poets are not practical and they have never given mothers credit for undertaking the greatest job in the universe without chance for experiment or without hope of repeating the job with different materials. The mother has but one garden of children and can make but one voyage with her lusty crew.

OUR grandmothers with their larger families did not perhaps face the emptiness and yearning as soon as many of the mothers now, but perhaps the modern life holds more to do for our *mothers emeritus*. However, *mothers emeritus* cannot set themselves up successfully as parental pedagogues. Young mothers resent too much interference and prefer to develop their own technic of fondling and spanking. It may be just as well, therefore, that the accumulated knowledge of mothercraft is not so readily or so easily taught by experts as journalism or plumbing. Things too easily taught are just as apt soon to be forgotten or miserably bungled.

Mothers can be proud of one achievement, namely, they are the

only human beings to whom successful men, besides themselves, give credit for their success. In many cases the successful men in achieving it secretly surprise their mothers more than anybody else who knew them as kids. But mothers are good sports and never give the boys away.

On the other hand, let us be generous with the failures. No jailer or poorhouse manager ever heard inmates blame their ill fortune upon motherhood. They pick on paterfamilias, the climate, tough neighbors, or the protective tariff. This shows what a sacred symbol motherhood has become through the ages, and testifies that the saving grace of humanity depends on the women folks.

SET down the sacred word, "Mother." Let M stand for mercy, O for obedience, T for tenderness, H for humanity, E for energy, and R for resignation.

Of what good are our protestations of devotion and our worshipful reverence to an Ideal if we do not blend into our own lives in some degree those inherent attributes of maternal majesty!

"The quality of mercy is not strained; it droppeth as the gentle rain from Heaven upon the earth beneath," says the old Thespian. He shows us that mercy is not a weakness in all cases and that if we would have mercy shown to us, we must ourselves acquire it.

"Obedience is the first law of the land," remarks an old Saxon sage. Too many of us are behaving like children these days just to find out if there isn't a thrill in the still and a wallop in the liquid leg of a malevolent mule! Those who take high command must first learn to obey, and liberty is secure only through respect for law—even though you *didn't* make it, like the law of Moses.

Tenderness is not the spiritual opposite of endurance, but it is tbe antithesis of cruelty and intolerance. It is the crowning gift of motherhood to her children, and is often more startling and appealing in men than it is in women. When I see a sober man try to hide a tear of compassion, he is my friend.

Humanity is the art of remembering that this world has held few angels since quack-grass sprouted in Eden. It is the intricate art of discrimination in judging our fellow passengers and making allowance for some who seem to have forgotten their tickets. That's why we ought to take as much pains picking our judges and policemen as we do golf clubs and bridge partners. But we can't all be as wise as our mothers, and so our criminal trials and punishments may take a little more time for adjustment.

Energy is the attribute of which a mother must have nothing else but. It is the main spring of her entire works and the chief element of success in her managerial ability.

Resignation does not simply mean sitting with folded hands on an urn. No, you are thinking of some bootlegger's monument. Resignation means being willing to finish what you started if there is anybody depending upon you or it. It means doing the little dishwashing obscurity jobs as nicely and bravely as you hit a homerun with the bases full. It means cheerily forgetting that your great aunt predicted you would be president. Remember, many a man has also had all the qualifications of some who reached there, and without choosing to run either!

And so, finally my friends, we have arrived at the end of the chapter—right back again to Mother's Day. Therefore, pin on your posy and sally forth to show the folks what a master hand your mother was at doing her duty to the waiting world.

No wonder they refer to colleges as Alma Mater—great places for breaking in freshmen!

USEFUL

The man from the backwoods led his overgrown son into country schoolhouse.

"This here boy's arter larnin," he announced. "What's yer bill o' fare?"

"Our curriculum, sir," corrected the schoolmaster, "embraces geography, arithmetic, trigonometry, —"

"That'll do," interrupted the father, "that'll do. Load him up well with triggernometry. He's the only poor shot in the family."

"Johnnie," said a teacher in physiology class. "Can you give a familiar example of the human body as it adapts itself to changed conditions?"

"Aunt gained fifty pounds in a year, and her skin never cracked."—Methodist Recorder.

PLAIN LANGUAGE

"Au revoir," said Ikey.

"Vat's dat?" asked Izzy.

"Dat's goodbye in French."

"Vell," said Izzy, "carbolic acid."

"Vat's dat?" asked Ikey.

"Dat's goodbye in any language."

50-50

"Half the City Council Are Crooks," was the glaring headline.

A retraction in full was demanded of the editor under penalty of arrest.

Next afternoon the headlines read:

"Half the City Council Aren't Crooks."—*Kreolite News.*

ON HIS WAY

Two elderly men, both extremely deaf, met on a country road. Dave had a fishing pole in his wagon. When he saw his friend Jim he stopped the horse.

"Goin' fishin'?" shouted Jim.

"No," Dave replied. "I'm goin' fishin'."

"Oh," said Jim, "I thought mebbe you was goin' fishin'."

"What's the fuss in the schoolyard, sonny?" asked the gentleman passing a ward school.

"Why, the doctor's just been around examinin' us, an' one of the deficient boys is knockin' hell out of a perfect kid."—*Weather-Vein.*

Officer—"Say, didn't you see that stop light?"

College Boy—"Sure, but I didn't see you."

"Son, what does this 60 mean on your report card?"

"That's the temperature of the room, father."

Sambo—"Yes, suh, business ben fine. Mah wife done gib me ten dollars an' Ah bought a pig. Ah kept tradin' fo' eberything under de sun, till finally Ah gets a bicycle, and Ah sold it fo' ten dollars."

Rastus—"But you-all doan' make any money."

Sambo—"Co'se not. But look at de business Ah's been doin'!"

"Corn Seed Treatment Can Be Recommended"

Says Illinois Agricultural Experiment Station

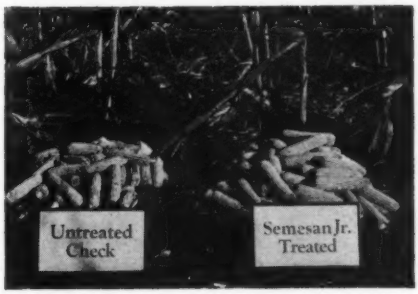
REGARDLESS of the care taken in selecting seed corn and the price paid, seed may be diseased with one or more of the root rot organisms. This has been proved conclusively by the Illinois Agricultural Experiment Station, which reports: "No seed corn of which there is enough for farm use is entirely free from disease. Even though seed is carefully tested in a germinator, the best name that can be applied to it is 'nearly disease-free.' The average farmer's seed is rather badly diseased. This causes a big decrease in yield which the farmer can ill afford."

Since the most carefully selected seed is subject to contamination by soil borne organisms, the best practice to assure a good crop is to treat all seed corn, both tested and untested, with Semesan Jr.

That seed treatment pays handsome profits is the conclusion reached by Dr. Benjamin Koehler and Dr. George H. Dungan of the Illinois Agricultural Experiment Station who cooperated in extensive tests with Dr. J. R. Holbert of the U. S. Department of Agriculture.

In the Forty-First Annual Report of the Illinois Experiment Station, these authorities say: "Seed treatments with the right fungicides for the control of corn rot diseases are paving the way to increases in yield and it is becoming evident that this practice should be recommended to farmers. Although treating good seed usually swells the yield only a few bushels an acre, this increase is practically clear profit, since the cost of the chemical used is only 2½c. an acre."

U. S. Dept. of Agriculture Circular 34 reports that Semesan Jr. gave average increased yields of 1.9 bushels per acre with nearly disease-free seed, and 12 bushels with diseased seed. Reports from corn growers in many states show other yield increases even greater than those reported in that Circular.



Field tests on farmers' seed box corn show that untreated seed produced only 33.0 bushels per acre compared with 54.7 bushels from Semesan Jr. treated seed of the same lot.

Other Du Bay Seed Disinfectants are: Ceresan, for seed grains; Semesan Bel, for seed potatoes; and Semesan, for vegetable and flower seeds and bulbs.

SAMPLES FURNISHED

Plan your seed treatment projects now. We will furnish gratis samples of any or all of our disinfectants to those Cooperative Agricultural Extension and Vocational Agricultural Workers who will plant demonstration plots of treated and untreated checks and report to us the results of disease control and yield increases. Send a list of crops to be treated with request for samples and descriptive literature to Bayer-Semesan Company, Inc., 105 Hudson Street, New York, N. Y., successor to Seed Disinfectants Divisions of E. I. du Pont de Nemours & Co., Inc., and The Bayer Company, Inc.

DU BAY

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SEMESAN JR.

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Dust Disinfectant for Seed Corn

Is Your Hay-mow Empty?

THERE'S nothing so expensive as failure — in growing legumes. Farmers faced with empty hay-mows realize this today. When your alfalfa or clover crop fails you lose your seed money and you are without hay to balance the corn in your livestock ration.

"Many failures with alfalfa and clover are due to a lack of available potash," this statement by a leading authority is based on years of work by mid-western experiment stations. Fill your hay-mow next year by using lime and fertilizer this spring. Make sure your fertilizer contains plenty of potash. IT PAYS!

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